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BIDS WORKING PAPER

Working Paper No. 6

SERICULTURE INDUSTRY IN BANGLADESH :
A CASE STUDY*

Pratima Paul Majumder
Salimullah

December 1988

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December 1988

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* This paper on sericulture industry was prepared in November, 1981 under the Rural Industries Study Project (RISP) undertaken by the Bangladesh Institute of Development Studies during 1978-80.

** The authors are respectively Research Fellow and Research Associate at the Bangladesh Institute of Development Studies E-17 Agargaon, Sher-e-Bangla Nagar, Dhaka 1207, Bangladesh. They are grateful to Dr. Q.K. Ahmad of the then Project Director, Mr. Matilal Paul a professional Economist with United Nations, Dr. Zaid Bakht of BIDS and Prof. Clarence Melony, consultant, RISP for their guidance in preparing this report. The remaining errors are the authors alone.

Foreword

Sericulture in Bangladesh had a glorious past and has a bright future. It is only the present where the picture is somewhat less exciting.

Silk and muslins from this region have been mentioned in the accounts of many travellers and historians from pre-Christ days. It is true that the glory of the ancient textile industry in this region was epitomised by first the muslins and later the figured muslins (jamdani) of Dhaka which flourished most during the period of the moghuls. The usual raw materials for muslins was 'karpas' a special type of cotton. But silk was never lagging behind. Kautilya's 'Arthashashtra' mentions both types as important products of the region. Also from various historians' accounts it is clear that trade in silk was flourishing throughout the centuries till the British arrived on the scene.

The decline in sericulture is quite clearly a phenomenon of the British period when indigenous textile industry as a whole underwent a tremendous setback. It is understandable why colonisation destroyed the local textile industry, but what is not clear is why the specialised textiles, at least the raw material for them, was also allowed to dwindle away. To give an indication of the decline of sericulture, raw silk production came down in Rajshahi district from around 400 thousand pounds in 1876 to about 22 thousand pounds in 1911 and virtual extinction by 1947. By this time the skills for producing the finest fabrics was also at a very low ebb.

During the Pakistan period some attempts were made to improve the condition of sericulture in the then East Pakistan (now Bangladesh) some nurseries and the silk factory in Rajshahi were developed and a Design Centre under EPSIC was set up to provide some design and marketing support. But the lead in weaving was soon taken away by the more advanced weaving industries of West Pakistan. Nevertheless raw silk production registered increase during this period.

During the Bangladesh period the measures in the sericulture sector have been comparatively more pronounced. A Sericulture Board has been established, nurseries increased and a new silk factory set up in Rangpur. A project has been undertaken with the Swiss to improve the production technology. Marketing promotion has been enhanced. The results in terms of increase in acreage under mulberry plants, employment of manpower and production of cocoon as well as finished silk have all shown marked increases during the last ten years and particularly so during the last four years of this decade.

Yet the overall condition of sericulture is far from satisfactory. And the potential is far from realised. The quantity and quality are both meagre compared to other silk producing countries, the technology is backward, institutional support inadequate and the marketing structure exploitative of the raw material producers. The Sericulture Board while solving some problems has added several others particularly in the grading and purchase of cocoons. There is need of credit, services and supplies all of which can be provided without too much strain.

The hope for Bangladesh sericulture lies in the fact that the basic ecological conditions are right, the skills are available and the required technology is not beyond the reach of Bangladesh, and yet so little has really been done seriously. On the other hand, whatever little was done paid off so well. Sericulture, like agriculture, pisciculture, horticulture and apiculture is yet another story of unrealised potential.

This report on sericulture is one amongst about a dozen case studies out of the BIDS research project on rural industries. The objective of this report was to look into the sector at some depth and clarify some of the issues in respect of problems and prospects of sericulture. We hope the report is found useful particularly by policy makers and future entrepreneurs.

The present study on rural industries of Bangladesh was undertaken by BIDS to fill in the gap in contemporary knowledge relating to this sector to facilitate policy planning and project development. This research project, has been implemented under contract with the Bangladesh Small and Cottage Industries Corporation (BSCIC) coordinated by Bangladesh Planning Commission, and funded by the United States Agency for International Development (USAID). I wish to record our gratitude to these organisations for their assistance and cooperation. Since the surveys were conducted over a long period of time the respondents had to spend a lot of time to supply the information during repeated visits by investigators. The cooperation of local leaders, businessmen and officials facilitated the data collection process. Our sincere thanks are due to all of them.

The BIDS staff members engaged either full time or part time in RISP and all temporary employees of the project have worked hard to complete the study successfully and fruitfully. And I hope their efforts are rewarded by adequate use of the information. Enquiries about additional information and critical comments on this and other reports from this project will be welcome.

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SERICULTURE INDUSTRY IN BANGLADESH: A CASE STUDY

CHAPTER I

1.1 Introduction

The sericulture industry in Bengal (a part of which is now Bangladesh) is known for centuries with a glorious tradition. During the period of the Moghals sericulture was a flourishing industry. The following quotation from Bernier gives an overall picture:

"(T) here is in Bengal such a quantity of cotton and silk, that the kingdom may be called the common store-house for these two kinds of merchandise, not of Hindustan or the Empire of the great Moghals only, but of all the neighbouring kingdoms and even of Europe"¹.

At the end of the seventeenth century when the British East India Company established itself in India, the period of decline of silk weaving in Bengal began. The Company came to realise that raw silk rather than wrought silk would better serve the national interest of England in feeding the British silk textile industry where power-driven machinery were already introduced. In pursuing this interest the Company undertook various measures to destroy the silk weaving industry in Bengal so that the Company could capture the entire market for textile products in Bengal. In many cases it happened that the Company people even forcibly cut the thumbs (the finger that is an essential organ in hand weaving) of the weavers. As a result of all these destructive measures the then Bengal, once known as the emporium of the silk trade, was reduced to being the producer of raw silk for the silk industry in England. In 1876, in Rajshahi district alone the average annual production of raw silk was about 409,970 pounds².

¹As quoted in Mukharjee, R. The Rise and Fall of the East India Company, New York: Monthly Review Press, 1974, p. 236.

²Giddiqui, A. Bangladesh District Gazetteers, Rajshahi, Dhaka: Bangladesh Government Press, 1976, p. 153.

But from the beginning of the twentieth century even the production of raw silk marked a steady decline. By 1911, production was only 22,000 pounds¹. By 1947, the industry was on the verge of extinction producing little more than 100 pounds of silk in only a few villages in Charghat police station, Rajshahi². The main reasons for this downfall of the sericulture industry may be identified as follows:

- i) Outbreak of a virus disease known as pebrine affected the butterfly,
- ii) decline of the quantity of local multivoltine,
- iii) absence of necessary government effort,
- iv) entry of China and Japan in the European silk market, taking advantage of the Suez Canal.

Then came the partition of 1947 which gave a fatal blow to the sericulture industry of East Pakistan (now Bangladesh). The partition left practically nothing in the form of machinery and technical silk to East Pakistan. It left behind only a considerable silk growing area (which previously used to supply raw silk to the silk weaving districts of Murshidabad and Maldaha) including two ill-equipped sericulture nurseries to the share of East Pakistan. After the partition most of the expert rearers, reelers and weavers who were predominantly Hindus migrated to India. The industry, thus, was faced a moribund condition having no channel known to the producers for the disposal of their product³.

After the partition the Government of East Pakistan (now Bangladesh) made several attempts to revitalize the sericulture industry. But these attempts brought a very slow progress since all these attempts were made

¹Ibid, p. 154

²Feldman S. Prospects for silk production in Bangladesh: A Study Commissioned by OXFAM, Dhaka, Bangladesh, p. 6.

³Development of Sericulture (1970-75); a project report, The East Pakistan Small Industries Corporation, Dhaka, May, 1970, p. 4.

from the 'top' having very little impact on the 'bottom', but it is the 'bottom' where lies the real key to the development of the sericulture industry.

After the liberation in 1971 the Government of Bangladesh also made strenuous efforts to revive the lost glories of the sericulture industry. But so far, very little improvement has taken place. Silk farmers who are in the centre of sericulture industry are in a deplorable condition both economically and socially. There is no incentive for them to cultivate mulberry and to raise cocoon. When we visited the farmers of Bholahat, a village in Rajshahi where most of the sericulture activities are concentrated, we were told by most of the farmers, that in the future they would have no more sericulture activity and instead they would grow paddy, mustard seed, mango and other crops which would give them secure income. They prefer a secure income of Tk. 1500 per bigha of land to Tk. 5,000 which they could earn from cocoon raising on the same plot of land, although with uncertainties. From this attitude of the farmers the present condition of the sericulture industry in Bangladesh can be easily surmised.

1.2 Importance of Sericulture Industry in Bangladesh

Climate and soil are the most important factors in the successful establishment of the sericulture industry. Certain conditions of temperature and humidity are necessary for silk worms to thrive and certain types of soil are necessary to grow food for silk worms. Both these conditions are found in the belt between 20° North and 42° North latitudes. Bangladesh has the unique advantage of being situated in this belt. Thus, the land in Bangladesh is suitable for mulberry cultivation and cocoon raising. The tropical climate of Bangladesh allows mulberry to be produced throughout the year and as such cocoon can be raised four to six times per year from the leaves of mulberry grown on the same land.

As at present sericulture industry in Bangladesh contributed about Tk. 60 million (at current price) to the total GDP of the country - (which constitutes about .03% of the total GDP). This industry provided employment to 41 lac people during the period 1979-80 and earned foreign exchange of Tk. 4.9 million. The economic position of sericulture industry can easily be understood from the following Table 1.1.

TABLE 1.1

ECONOMIC POSITION OF SERICULTURE INDUSTRY IN BANGLADESH

	1971-72	1977-78	1979-80
Acres under mulberry plantation	850 acres	1250 acres	2400 acres
Production of seed cocoon	8500 lbs	23000 lbs	-
Production of silk cocoon	300000 lbs	600000 lbs	1700000 lbs
Production of silk yarn	24000 lbs	39680 lbs	106250 lbs
Production of silk fabric	194400 yds	317432 yds	850000 yds
Employment	-	18000 persons	41000 persons
Foreign exchange earning	--	-	4900000 Taka

Sources: (1) Draft Second Five Year Plan, 1980-85, Planning Commission Government of the People's Republic of Bangladesh, P. XIII - 112.

(2) Performance evaluation of the First Five Year Plan and Two Year Plan and proposal for the Second Five Year Plan, Bangladesh Sericulture Board, p. 20.

Every effort should be made to develop sericulture industry as Bangladesh can achieve a variety of development goals through this industry. The following potentials may be mentioned.

- i) Potential for rural employment and income generation,
- ii) potential for achieving better income distribution through wider dispensal of income,
- iii) potential for earning foreign exchange.

In addition to these potentials there are many other economic advantages of sericulture development. These may be listed as follows:

- i) relatively small investment requirement to set up sericulture industry,
- ii) availability of indigenous capital,
- iii) availability of domestic raw-materials as it is a fully agro-based industry,
- iv) increasing income in the agricultural sector
- v) relatively small requirement for foreign exchange,
- vi) relatively short gestation period.

This vast potential for sericulture development in Bangladesh has not yet been explored. The present productivity is far below the level that the potentials warrant. There is, therefore, a great need for measure for the utilisation of the untapped resources to the extent that the potentials warrant. In this context the objectives of the present study is to generate a wide array of information on various aspect of sericulture industry with a view to ascertaining its potential for growth identifying constraints and problems and recommending appropriate development policies.

1.3 Review of the Literature: A Brief Note

There are two provincewide surveys of small and cottage industry conducted by East Pakistan Small Industries Corporation (EPSIC), in 1962-63 and 1963-64 respectively. Sericulture industry was a very small part of these surveys. As such the reports of these surveys published in 1964 and 1966 give information only on the magnitude of sericulture industry in terms of number of production/units, number of persons engaged, fixed investment, raw-materials consumed and goods produced. At this moment these information have little resemblance to the reality as about seventeen years passed away after these surveys were conducted.

The first published literature which is available on sericulture industry in Bangladesh after partition in 1947 is a project description namely "Development of Sericulture" undertaken by the East Pakistan Small Industries Corporation (EPSIC). It was published in May 1970. The objectives of this project were (1) modernisation of 12 Nurseries and 22 Extension Centres and (2) formation of rearing association on Cooperative basis etc. It simply contains project description and purpose and benefits of the project from which we can know little about the past, present and future of the sericulture industry in Bangladesh. It also gives a brief empirical evaluation of the schemes undertaken before this project. Empirical evidences provided by it shows that actual production of seed cocoon, commercial cocoon and silk yarn fulfil the production target only by 25% during the period 1962/1963 - 1968/1969. It also gives an idea about the deterioration of the quality of cocoon. Showing these inefficiencies of the past schemes this project emphasised the development of nurseries and extension centre which is the responsibility of the Government. As such it concluded that sericulture should be directly patronised by the Govt. by giving required help to the people in the art of rearing and production of mulberry leaves. It also concluded that protection from the imported raw silk yarn is a must citing the instance of India where protection started in 1934 and still continues.

Next to this project description there is a study report namely "A report on sericulture industry in East Pakistan" prepared by Pakistan Industrial Credit and Investment Corporation (PICIC) in June, 1970. It is a report of 29 pages consisting of six chapters which deal with past growth, present position and problems of the sericulture industry, economic justification of sericulture industry and international trends in silk production and silk exports. It contains some statistical tables giving information on yield and return per acre from major crops, comparison of actual and planned production of seed cocoons and commercial cocoons, production of silk yarn, foreign exchange earnings potential of different crops, estimated requirement of cocoon and mulberry cultivation to produce 800,000 lbs of silk yarn which was

recommended in the report as the production target for the next few years. At the end of the report there is an Appendix giving an example of South Korea where private and public participation as a means of giving assistance to the sericulture industry has been encouraged. In addition to the above mentioned two literature there is no other study or survey on Bangladesh sericulture industry before Bangladesh into being in 1971.

No comprehensive and empirical study on sericulture industry has taken place even after Bangladesh came into being. Immediately after liberation the Govt. of Bangladesh undertook some schemes and programmes¹ for developing sericulture industry in Bangladesh. But it is doubtful enough that these schemes and programme will bring any substantial good to the sericulture industry as these were not designed on any empirical information about problems and prospect of sericulture industry.

After liberation some voluntary organisations become active in Bangladesh to make comprehensive study on sericulture industry. OXFAM, a voluntary agency commissioned a study on the present status of the silk industry in Bangladesh. The report of this study, namely, "Prospects of Silk Production in Bangladesh" prepared by Shelley Feidman in September, 1978. This report is the result of an intensive three months study including interview and discussion with the relevant people, visit and reading done on the subject. The objectives of this study are (1) to review the present position/condition of the silk industry in the country (2) to see what voluntary agencies, foreign and local organisations and the Govt. are doing in this field and (3) to ascertain the potential of silk production and processing as a viable alternative source of income for the "poorrest of the poor" in the country.

^{1/} In the eighth chapter of this study, there is a brief description of all schemes and programmes undertaken so far, by the govt. of Bangladesh to develop sericulture industry in Bangladesh.

The objectives of the study are very ambitious and pragmatic. In pursuance of the objectives it tried to go into deep of almost all aspects of sericulture industry. Explanation and discussion made in it are methodical and reasonable. As such it seems that the recommendations made in it bear much weight in solving the problem of sericulture industry. But this is a study primarily, on endi silk production which accounts for only 8% of total sericultural employment and 6% of total silk production. It is because the voluntary agencies interest in silk production give primary emphasis on the expansion of endi silk production. OXFAM as a voluntary agency did the same. It gives a long list of socio-economic and political advantages of endi silk production.

However, development of sericulture in Bangladesh must be meant both the development of endi silk and mulberry silk as she has development scope for both these varieties of silk. We think, more emphasise should be given on mulberry silk production as it gives more money both to the producer and the Govt. Silk is universally sought after for its elegance and colour by the fashion loving people. Only mulberry silk can maintain elegance and colour whereas endi silk is of inferior quality and does not have elegance. Endi silk production however, also is necessary since it can create employment opportunities for woman folk. More over, endi both can conveniently be used as substitute for cotton cloth. Cotton cannot profitably be grown in Bangladesh. Export of ^{cloth} cotton yarn is also hampered for various reason after liberation. Endi silk production in large quantity may solve this problem of shortage of cotton cloth. As such, the study made by OXFAM is at right direction. But it has little to do with the mulberry silk development in Bangladesh. One most important drawback of this study is the lack of empirical evidence. All of the study report is a descriptive one. No statistical figure or table takes place in it.

CARE, another voluntary organisation conducted several surveys on sericulture industry in Bangladesh. These surveys are specially on endi silk production and aimed at assessing the success and failure of the sericulture programme launched by CARE in conjunction with the

Integrated Rural Development Programme (IRDP) in four thanas of Gopalpur, Kotwali, Mirzapur and Kaliakoir.

"Feasibility Study for a Bangladesh Swiss Development Project in Sericulture" is the most important and valuable one undertaken so far on sericulture industry in Bangladesh. The govt. of Switzerland in cooperation with the govt. of Bangladesh took the responsibility of looking into the prospects of sericulture industry in Bangladesh and, submitted a feasibility report in December 1977 after depicting all aspects of this industry. The report was made by P. Kuenzi, K. Sengupta and L.V. Saptharishni. With the responsibility of looking into the prospect of sericulture industry they made an assessment of the present situation of sericulture including technical aspects, research and training, organisational setup, marketing, credit facilities and economic importance of sericulture. From this assessment we have an overall picture of sericulture industry in Bangladesh. The discussion is very brief and provides statistical and diagrammatic information.

However, its findings and proposals are mostly based on official information. It is true that they made some field trips. But as an alien mission it could contact only the elite sericulturists from whom it could know a little of the real fact. Therefore, the proposals made by the Mission may have little resemblance to the reality. For example, one of the most important findings of the "Feasibility Study for Swiss Bangladesh Bilateral Project in Sericulture" is that the cocoon growers are exploited badly by some of the Khatghai - Wallahs¹ who keep the cocoon grower under their clutches by advancing funds from time to time for consumption and social need of the growers and underpaying them for their cocoons season after season². In this context

^{1/} Khatghai Wallah is the local name of the reeler.

^{2/} The Swiss Bangladesh Bilateral Project in Sericulture, op. cit., Appendix A., p. 7.

suggestion made in the project to establish a notified cocoon market with the responsibility of conducting all purchase and sale of cocoon, including price fixation for different varieties of cocoon. But the findings of the present survey in this respect, reveal a different story. It is found in the present survey that most of the problems of cocoon marketing in Bholahat is created by the notified cocoon market established by the Sericulture Board.

The Swiss Bangladesh Bilateral Project is actually an extension programme. The plans and proposals applicable for extension areas may not be applicable for the areas which have centuries old tradition of sericulture activities. Thus, the suggestions made in the Feasibility Study Report has little to do with the sericulture activities which are being carried on in Bholahat for centuries together.

1.4 Need for the Present Study

The need for the present study arose mainly on account of the absence of any comprehensive empirical study on sericulture industry in Bangladesh. Due to the absence of indepth investigation into this industry, there is lack of proper information on its operative condition including technology, efficiency in terms of employment creation and income generation, finance, marketing, institution infrastructure etc. It creates a serious problem for proper formulation of policies for the development of the industry. As such, the present study aims at drawing an integrated and detailed picture of the sericulture industry in Bangladesh after making an empirical appraisal of the present operative condition of the sericulture industry and socio-economic characteristics of the sericulture entrepreneurs. The study also seeks to identify the constraints and problems and to recommend appropriate development policies. This kind of in-depth investigation will be exposed before the nation, the pragmatic development possibilities of sericulture industry in Bangladesh.

1.5 Scope and Methodology of the Study

The present survey has been undertaken as a case study under the Rural Industries Study Project (RISP, 1978-80) conducted by the Bangladesh Institute of Development Studies.

To prepare the case study a three months intensive field investigation was undertaken in Bholahat and Shibganj - two thanas of Rajshahi district, and in Mirpur of Dhaka City. These three thanas were selected as sample areas for investigation on the basis of the following considerations:

a) Bholahat has centuries old tradition of sericulture activities of planting, rearing and reeling. More than half of total acreage under mulberry production in the country is concentrated in Bholahat. More than half of the total production of cocoon and half of the total production of silk yarn of the country are produced in this area. Thus, investigation in this area will tell maximum about the sericulture activities.

b) Shibganj is selected on the basis of the concentration of silk weaving activities. The weavers of Shibganj produce more than 32% of the total production of silk fabric in the country.

c) Mirpur of Dhaka city was selected on the consideration that this is the only place in Bangladesh where Katan Saree¹ of Banaras design is produced. All weavers of Mirpur producing Katan Saree migrated from Banaras, India just after the partition of 1947. Katan saree is the costliest and most glamorous product of the silk textile industry and accounts for more than 37% of the total silk product of the country. Thus, without an investigation in Mirpur the survey cannot tell completely about the silk industry.

¹/ Katan Saree - A kind of saree made of pure silk with hand embroidery work of Jorri and Silk thread.

Extension areas of sericulture activities are kept out of the scope of the present study since prospects and problems of sericulture activities carried on in extension areas (where sericulture activities are highly subsidised by various GOS and NGOs) are different from those in the areas having centuries old tradition of sericulture activities. For the purpose of the present study some field trips were made in the extension centres to ascertain the extension activities.

A comprehensive questionnaire was prepared to generate information on various aspects of sericulture industry. As the objective of the study is to appraise the operative condition of the sericulture industry and thereby to examine the income and employment potentials of this industry the questionnaire aims at collecting informations so that these objective are best served. Before giving the final shape to the questionnaire the planting, rearing, reeling and weaving entrepreneurs of different areas of sericulture industry were interviewed thoroughly to have a practical idea about problems they face. Some broad discussion and consultation with the officials of the Sericulture Board and authority responsible for implementing the Swiss-Bangladesh Bilateral Programme and the Crash Programme of the Bangladesh Government were made. Discussion and consultation held with them helped a lot in preparing the questionnaire.

The unit of investigation is the sericulture enterprise. In all 252 enterprises were included in the survey. Four types of enterprise are identified according to the last stage of sericulture activity they perform. Following is the distribution of the enterprises according to location and type of activity they perform.

Bholahat has been accorded greater weight in terms of the number of enterprise than other areas as there concentrate three types of sericulture activities namely planting, rearing and reeling activity whereas weaving activity is concentrated only in Shibaganj and Mirpur. It was decided to interview more enterprises from Shibganj than those from Mirpur although Mirpur contributes more to

the total production of silk fabric of the country than that contributed by Shibganj. It is because of the fact that weaving enterprise in Shibganj is directly related with the planting, rearing and reeling enterprise in Bholahat and thus, investigation into the weaving enterprise in Shibganj will tell more about the problems and prospects of sericulture industry in Bangladesh than that in Mirpur which is far away from Bholahat, the life centre of silk industry in Bangladesh and where the weavers use mostly imported silk yarn and artificial silk yarn.

TABLE 1.2

DISTRIBUTION OF ENTERPRISES BY LOCATION AND TYPE OF ACTIVITY

Location	Enterprise type				Total
	Planting enterprise	Rearing enterprise	Reeling enterprise	Weaving enterprise	
Bholahat	19	142	26	-	187
Shibganj	-	-	-	44	44
Mirpur	-	-	-	21	22
Total	19	142	26	65	252

6 Definition of Sericulture Industry

____ Sericulture activities involve, by stages, plantation of mulberry, production of silk worm eggs and rearing of silk worms, reeling of silk yarn, and weaving of silk cloth. Sometimes the activity of silk weaving is excluded from the sericulture industry since, this kind of activity is usually included, in the textile industry. But the performance in the intermediary stages of mulberry production, silk worm rearing and silk yarn reeling cannot be properly evaluated without an evaluation of the performance in the silk weaving activity which is the final stage of all activities of the sericulture industry. Therefore, in order to have fulfledged picture of the sericulture

industry, the activity of silk weaving is included in sericulture activities in this study.

1.7 Nature of Sericulture Activity

The sericulture industry interestingly, comprises of agricultural and manufactural activities. The activities of planting and rearing come under agriculture while the activities of reeling and weaving come under manufacture. To have a clear understanding, a brief description about the nature of these two kinds of activity is given below:

1.7.1 Planting of Mulberry

Mulberry leaf is the absolute food of the silk worm. Many experiments and observations were carried out with artificial food and leaves of various plant as a substitute for the mulberry leaves. None proved to be the successful alternative to the mulberry which is still used as the only dependable food of the silk worm. Moreover, mulberry leaf has no use except as the food for silk worm and it is only for the silk worm that the mulberry is cultivated.

There are two types of mulberry plantation viz, tree type and bush type plantation. Tree type mulberry plant - hard trunk long lived tree. Once planted this tree produces leaves for 15 years without break. Bush is planted at a spacing of three feet and mature under this condition in about six months. The same plant gives almost equal amount of leaves each harvest for continuous five years. After five years replantation is necessary. This system of plantation provides quick return in six months whereas tree type plantation takes as long as three years to mature.

Mulberry is cultivated in comparatively high land free from standing water. Slightly acidic, plain, high land composed of loaming or clay loam soil having good rain fall is best suitable for mulberry cultivation. The climate and soil of Bangladesh allow good mulberry to grow throughout the year and as such, it is possible in Bangladesh to rear silk worm four to six times a year with the mulberry leaves grown on the same plot of land whereas, in countries like Japan, China and South Korea who are developed in silk industry, silk worm could be reared only twice a year.

1.7.2 Rearing of Silk Worm

Silk worm rearing is another agricultural aspect of sericulture industry. The time of rearing of silk worm should coincide with the proper sprouting of mulberry leaves and a plentiful supply of leaves. Thus, silk worm rearing is the second stage of sericulture production.

There are four kinds of silk worm namely mulberry silk worm, eri silk worm, tasar silk worm and muga silk worm. Mulberry silk worms are those which feed on mulberry leaves and produce cocoons with continuous silk filament and therefore, can be reeled to produce silk yarn.

Eri silk worms are domesticated and reared on castor oil plant leaves. This worm produces cocoon with discontinuous silk filament and as such cannot be properly reeled. The moths are allowed to emerge and the pierced cocoon are used for spinning purpose to produce the endi silk yarn.

Tasar silk worms are wild silk worms feed on leaves of termination and several other minor host plant. Their cocoon like mulberry cocoon can be reeled.

Muga silk worms are found only in the state of Assam in India. This kind of worm feeds on soalu leaves and produce an unusual lustrous golden yellow thread.

Among these four kinds of silk worms mulberry silk worm is the most important as it produces more than 95% of the total cocoon of the world. In Bangladesh also mulberry cocoon accounts for more than 95% of the total population of cocoon. Therefore, the present study entirely concentrates on mulberry silk worm. Moreover, there is not a single enterprise rearing eri worm is found in the areas included in the survey.

The mulberry silk worm may be classified as univoltine, bivoltine and multivoltine depending upon the number of generations produced in a year under natural conditions. Univoltine and bivoltine races of silk worm produces cocoon with higher silk content than multivoltine

race. But these races thrive well only in temperate and colder spring conditions. In Bangladesh univoltine and bivoltine races of silk worm can be reared well only in the winter season.

The silk worm passes through four distinct stages namely egg, larva, pupa and adult during its life cycle. The duration of life cycle may last for six to eight weeks depending on racial characteristics and climatic conditions. Multivoltine races reared well in tropical areas have the shortest life cycle and as such they may yield as many as six to seven generation in a year in tropical sericulture areas. Silk worm rearing is therefore, a continuous process in tropical areas whereas in temperate zones it is mostly seasonal.

During the larval life the worm moults skin four times. After the silk worm passes through four moults it becomes mature for mounting. At this stage it attains its maximum weight and losses its appetite and stops eating. The spinning of the cocoon starts almost immediately after mounting. Spinning takes 48-72 hours to be completed and in another 24-48 hours worm transforms itself into the pupa within the cocoon. The pupa become adult moth in 8-14 days and emerges piercing the fibrous cocoon shell.

1.7.3 Reeling

Reeling is the manufactural sequel to mulberry planting and silk worm rearing while weaving is the manufactural sequel to reeling. Reeling is a process through which silk filament of the cocoon is unwinded to form a composit silk yarn and weaving is a process through which reeled silk yarn is manufactured into silk fabrics.

Size and magnitude of the sericulture industry depend to a great extent on the techniques used in reeling and weaving.

But the technique used in reeling is not free from the technique used in rearing silk worm. Generally the technique use din reeling follows from the technique used in rearing and availability of labour. For example, modern reeling factory using electric power and employing advanced technology with sophisticated automatic machines, is found in countries where the bulk of the cocoons

are superior quality and where labour is both scarce and costly. In countries where the bulk of cocoons produced is not good enough for highly mechanised and automatic reeling and where reeling can be practised as a labour intensive activity, reeling establishment is organised as a cottage industry of individualistic character using either foot powered or hand driven appliances.

1.7.4 Weaving

Silk is woven mainly in hand-loom, because silk yarn reeled in cottage industry cannot be woven efficiently in mechanised automatic loom. In Bangladesh less than 25% of total silk fabric produced in Rajshahi silk factory which has automatic loom. The success of sericulture industry depends to a great extent on the success of reeling and weaving activity.

1.3 Types of Sericulture Enterprise

Sericulture is a family based activity as it employs mostly family labour. Each sericulture family constitutes a sericulture production unit. In the present study all sericulture production units are generally identified as sericulture enterprises - irrespective of their agricultural or manufactural nature. A sericulture enterprise may be engaged in only one of the four stages of sericulture activity - planting, rearing, reeling and weaving - or it may be an integrated enterprise performing a combination of these four stages. In the present study, sericulture enterprises are classified into four groups according to the last stage of activity they perform, but all the stages of activity performed by each enterprise are also identified. In table 1.3, the vertical column shows the classification of sample sericulture enterprises and the horizontal row shows the different stages of sericulture activity they perform. Thus, the summation of the elements in the principal diagonal in the table gives the total number of enterprises interviewed. Total number of enterprise interviewed is 252. Out of these 252 enterprise, 19 are grouped as planting enterprises, 142 as rearing enterprises, 26 as reeling enterprises and 65 as weaving enterprises, according to the last stage of activity they perform. As is evidence from the

TABLE 1.3

DISTRIBUTION OF SAMPLE ENTERPRISES BY LAST STAGE OF ACTIVITY

Stages of Activity classification or sericulture enterprise	Sericulture activity			
	Planting of mulberry/ veranda	Raising of cocoon	Reeling/ spinning of silk yarn	Weaving of silk cloth
Planting enterprise	19 (7.9)	-		
Rearing enterprise	140 (55.3)	142 (56.1)		
Reeling enterprise	25 (9.9)	26 (10.3)	26 (10.3)	
Weaving enterprise	2 (0.8)	2 (0.8)	- (25.7)	65
Total	187 (74.91)	170 (67.19)	26 (10.3)	65 (25.7)

Figures in parantheses show the percentages
of total number of enterprise i.e. 252.

above table that there are only two rearing enterprise who are not performing planting activity. All other rearing enterprises constituting a total of 140 enterprises perform both planting and rearing activity.. Thus, by rearing enterprise, as is called in the present study, is meant an enterprise performing both planting and rearing activity. It is also observed from the table that all reeling enterprise except only one, perform three activities namely, plantign, rearing and reeling. As such by reeling enterprise is meant in the present study an enterprise performing three stages of activity in successive sequence starting from planting. About weaving enterprise the table shows that there are only two weaving enterprises perform weaving activity together with planting and rearing activities. But all other weaving enterprises constituting a total of 63 enterprise perform only weaving activity. Hence, by weaving enterprise is meant in the present study, an enterprise performing only weaving activity.

1.9 Integration of Different Stages of Sericulture Activity

All stages of sericulture activities are connected so closely that it is quite impossible to plan production of one of the activities in isolation from the production of the other stages of activities. The close input output relationships among the various sectors and the special supply and demand conditions point to the necessity of a well knit vertical integration of all the stages of sericulture activities for the development of the sericulture industry. Otherwise there will be variability in both the quantity and the quality since at every stage of activity there are hundreds of small producers who take decisions individually.

Table 1.4 presents the number and percentage of sericulture enterprises engaged in one single stage or a combination of two, three or four stage. As evident from this table, there is not a single enterprises performing all the four stages of sericulture activities. Only about 10% of the sericulture enterprises interviewed perform three stages of activities in the vertical sequence starting from planting. There are two enterprises which perform three stages of activities but not in the successive sequence. They perform planting, rearing and weaving activities dropping the reeling activity in between.

More than 56% of the sericulture enterprises interviewed perform two stages of activity. Only one enterprise, among these performs two stages of activity including rearing and reeling. The rest of the sericulture enterprises in this group perform two stages of activity in a vertical sequence starting from planting.

The table 1.4 shows that about 34% of the sericulture enterprises interviewed perform only one stage of activity out of this 7.5% perform only the planting activity and 25% perform only the weaving activity. There are only two enterprises in this group performing only the rearing activity.

TABLE 1.4

NUMBER OF SERICULTURE ENTERPRISES ENGAGED IN ONE STAGE OR
A COMBINATION OF DIFFERENT STAGES OF SERICULTURE ACTIVITY

Stages of sericulture activity	No. of enterprises	% of total no. of enterprises
<u>One Stage</u>		
a) Planting	19	7.5
b) Rearing	2	0.8
c) Reeling	-	-
d) Weaving	63	25.0
Total	85	33.7
<u>Two Stages</u>		
a) Planting - Rearing	140	35.6
b) Rearing - Reeling	1	0.4
Total	142	56.1
<u>Three Stages</u>		
a) Planting - Rearing - Reeling	25	9.92
b) Planting - Rearing - Weaving	2	0.79
Total	27	10.72
<u>Four Stages</u>		
a) Planting - Rearing - Reeling - Weaving	-	-

CHAPTER II

SOCIO-ECONOMIC CHARACTERISTICS OF SERICULTURE ENTREPRENEURS

2.1 Religion and Migratory Status

Before the partition of India in 1947 the sericulture industry in Bangladesh was mainly dominated by Hindu entrepreneurs. But after the partition the picture changed totally. Hindus are now almost absent in the activities of planting, rearing and reeling. In the present survey not a single Hindu entrepreneur was found in these activities. This fact is evident from Table 2.1. But still now the weaving activity is dominated by Hindu entrepreneurs. It was found in the present survey that 52% of weaving entrepreneurs are Hindus.

TABLE 2.1

DISTRIBUTION OF SERICULTURE ENTREPRENEUR BY RELIGION

Entrepreneur type	Religion		
	Hindu	Muslim	All
Planting entrepreneur	-	19	19
Rearing entrepreneur	-	142	142
Reeling entrepreneur	-	26	26
Weaving entrepreneur	34	31	65
Total	34	218	252

The migratory status of the sericulture entrepreneurs is presented in Table 2.2. The rate of migration is lowest in case of weaving entrepreneurs. As appeared in the Table 2.2 that only 31% of the total weavers surveyed migrated from India. The reasons for migration mentioned by them are mostly political (see Table 2.3). Table 2.2 also shows that the rate of migration is highest for reeling enterprises and second highest for rearing enterprises. They migrated from India

TABLE 2.2

PERCENTAGE DISTRIBUTION OF SERICULTURE ENTREPRENEUR
BY MIGRATORY STATUS

Entrepreneur type	Migratory status			Total
	No migrated	Migrated from another country	Migrated from another district	
Planting entrepreneur	58	42	-	100
Rearing entrepreneur	53	46	1	100
Reeling entrepreneur	35	65	-	100
Weaving entrepreneur	69	31	-	100
Total	56	44		100

mainly due to political reasons. About 44% of total sericulture entrepreneur interviewed in the present survey, migrated from India. About 84% among them mentioned that political reason was responsible for their migration. Only 5% of them migrated due to economic reasons.

2.2 Sex and Age Distribution of Sericulture Entrepreneurs

Table 2.3 presents the distribution of sericulture entrepreneurs by sex and age group. It is interesting to note from the table that there is not a single female entrepreneur although most of the sericulture activities are performed by women. This is perhaps, another manifestation of the subservient status which the female have in our society.

It is noteworthy from the age distribution of sericulture entrepreneurs that too young and too old people have little scope in the entrepreneurship of the sericulture industry. Only 6% of the enterprises belong to the age group of below 25 years and about 7% of the enterprises belong to the age group of 65 years and above. The largest number of entrepreneurs belong to the age group of 35 to 50 years. This

TABLE 2.3

PERCENTAGE DISTRIBUTION OF SERICULTURE ENTREPRENEUR
BY SEX AND AGE GROUP

Age group (years)	Planting entrepreneur		Rearing entrepreneur		Reeling entrepreneur		Weaving entrepreneur		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
Low - 25	15.79	-	2.11	-	3.85	-	10.77	-	5.56
- 35	10.53	-	16.90	-	23.08	-	33.85	-	21.43
- 50	52.63	-	43.66	-	38.46	-	32.31	-	40.87
- 65	21.05	-	28.17	-	19.23	-	23.08	-	25.40
& above	-	-	9.15	-	15.38	-	-	-	6.75
Total	100.00		100.00		100.00		100.00		100.00

group accounts for about 41% of the total number of entrepreneurs. More than 1% and 25% of the total enterprises belong to the age group of 25 to 35 years and 50 to 65 years respectively. It is noticed that number of too young entrepreneur is very negligible in rearing and reeling enterprises whereas it is not that negligible in planting and weaving enterprises. About 16% of the total planting entrepreneurs belong to this group. In the case of planting enterprise land and physical labour are main factors of production and as the sons grow up land is distributed among them and the old father incapable of doing any physical labour becomes dependent on sons. The young sons with their share of land become planting entrepreneur. This explanation becomes more reasonable when it is noticed that there is not a single planting entrepreneur above 65 years. About 11% of the total weaving entrepreneur belongs to the age group of less than 25 years. Old entrepreneur father who is no more desirable in the weaving enterprise both from the point of physical and mental ability, transfers entrepreneurship to his sons. It is noticeable from the table 2.3. That in weaving enterprises there is not a single entrepreneur above 65 years old. Entrepreneur above 65 years have place in rearing and reeling enterprise as rearing and reeling activities do not involve high technique like weaving and physical strength like planting.

2.3 Size of Family of the Sericulture Entrepreneur

Size of family matters much in the sericulture activities as these kinds of activity employ mostly family members. There is a positive correlation between the size of family and concentration of different stages of sericulture activities. Bigger the size of family more and more stages of activity are concentrated. Distribution of sericulture entrepreneur by size of family is presented in Table 2.4. It can be seen from the table that the size of family is becoming bigger and bigger as one read in the table from planting to reeling enterprises and it has already been described in the first chapter of this report that planting enterprise concentrates only one stage of sericulture activity while rearing and reeling enterprise concentrates two and three stages of activity respectively. The chisquare test between the size of household and the degree of concentration of different stages of sericulture activity at 5% level of significance also confirms that there is a high association between these two variables. The chi-square distribution as obtained from the table 2.4 is as follows:

$$\chi^2 = 15.17$$

N Significant at 5% level of significance at 6 degrees of freedom.

TABLE 2.4

DISTRIBUTION OF SERICULTURE ENTREPRENEUR BY SIZE OF FAMILY

	Size of Family				All	Average size of family	Children per family
	Upto 4 Members	5 - 6 Members	7 - 9 Members	10 and Members			
Planting entrepreneur	4 (21.10)	6 (31.58)	7 (36.84)	2 (10.53)	19 (100)	6.84	4.05
Rearing entrepreneur	11 (7.75)	40 (28.19)	57 (40.14)	34 (23.94)	142 (100)	7.67	3.66
Reeling entrepreneur	-	6 (23.08)	7 (26.92)	13 (50.00)	26 (100)	9.38	4.42
Weaving entrepreneur	9 (13.85)	14 (21.54)	23 (35.36)	19 (29.23)	65 (100)	8.37	4.20
Total	24 (9.52)	66 (26.19)	94 (37.39)	68 (26.98)	252 (1000)		

Figures within parentheses represent the percentage of row total.

The Table 2.5 shows that about 50% of the reeling entrepreneurs performing three stage of activities, belongs to the family size of 10 members and above whereas only 10.5% of the planting enterprises performing only one stage of activity, belongs to this size of family. The same table shows that more than 21% of the planting entrepreneurs have the family consisting less than 4 members whereas there is not a single reeling entrepreneurs having such small size of family.

2.4 Level of Education

Sericulture education and sericulture training are received by the sericulturist from his family where sericulture activities are practised for generations. Technique of sericulture activities passes down from father to son, son to grandson and so on and so forth. Thus, it appears that family is the best training institute for sericulture industry and hence formal education has very little scope to be applied in sericulture activities. Table 2.5 shows that only 4.4% of total entrepreneurs has primary education. More than half of this number belongs to weaving enterprises. Only one entrepreneur out of the total has higher education. There is not a single entrepreneur who has vocational training.

TABLE 2.5

DISTRIBUTION OF SERICULTURE ENTREPRENEUR BY EDUCATION

Entrepreneur type	All	No education	Primary	Secondary	Higher secondary & above	Vocational training
Planting entrepreneur	19 (100.00)	19 (100.00)	-	-	-	-
Rearing entrepreneur	142 (100.00)	139 (97.89)	2 (1.41)	-	1 (0.70)	-
Reeling entrepreneur	26 (100.00)	25 (96.15)	1 (3.85)	-	-	-
Weaving entrepreneur	65 (100.00)	57 (87.69)	8 (12.31)	-	-	-
Total	252 (100.00)	240 (95.23)	11 (4.37)	-	1 (.40)	-

Figures within parentheses represents the percentage of group total.

But in the age of scientific development no trade can survive for a long time depending on the traditional technique. Therefore the present condition of education in sericulture cannot be allowed to continue.

Government of Bangladesh and various voluntary organisation launched training programme on sericulture. There are two to three training courses each year. Every year hundreds of trainee are coming out finishing their training. Of course, an evaluation of these programme is necessary to know how efficiently the out-gone trainees are using their training for production purpose.

2.5 Reasons for Involvement in Sericulture Activities

Sericulture is a traditional occupation passing down from generation to generation. As such it is nothing unnatural that the most prominent reason for involvement in sericulture activities is family tradition. Different reasons for involvement in sericulture activities are presented in the Table 2.6. As the table shows that one to all planting and reeling entrepreneurs interviewed, are involved in sericulture activity by way of family tradition. Only 2.11% of the rearing entrepreneurs undertook sericulture activity due to the high demand for sericulture product in the market. The rest of the rearing entrepreneurs are traditionally involved in sericulture activity. Weaving is family tradition to 83% of the entrepreneurs. A little more than 9% of the weaving entrepreneurs undertook weaving activity due to high demand of silk cloth in the market and about 8% of the weaving entrepreneur undertook weaving activity due to availability of facilities for weaving activity. But this picture will be different in the extension centres of sericulture activity where people are undertaking sericulture activity due to the availability of training and other facilities such as easy loan, supply of raw materials at cheaper price etc.

TABLE 2.6

PERCENTAGE OF ENTREPRENEUR STATING DIFFERENT REASONS FOR
INVOLVEMENT IN SERICULTURE ACTIVITIES

Reasons	Planting entrepre- neur	Rearing entrepre- neur	Reeling entrepre- neur	Weaving entrepre- neur
Family tradition	100	97.89	100	83.07
Training/Education in such kind of activity	-	-	-	-
Demand for the product in the market	-	2.11	-	9.23
Availability of facilities	-	-	-	7.70
Total	100	100	100	100

2.6 Community Role

By nature of job sericulture activities have higher social status than many other rural trad like pottery, blacksmithy, carpentry, fishing etc. This factor may help the sericulturist to enter into rural elite group of Chairman, Member, Sardar, Matabbar, Morol etc. The Table 2.7 is showing the community role played by different types of sericulture entrepreneur. As is evidenced by the table that more than 15% of total sericulture entrepreneur belongs to the elite group. Among them percentage of weaving entrepreneur is maximum. Economic factor lies behind this reason. Economically weavers are in best position. So, they are in largest percentage playing the community role. Next comes reeler, rearer and planter in u pward succession with the percentage of elite persons decreasing.

TABLE 2.7

COMMUNITY ROLE PLAYED BY THE SERICULTURE ENTREPRENEUR

Entrepreneur type	Social status				
	All	Chairman	Member	Sardar	Matabbar
Planting entrepreneur	1 (5.30)	-	-	4 (5.3)	--
Rearing entrepreneur	20 (14.00)	1 (0.7)	-	10 (7.0)	9 (6.30)
Reeling entrepreneur	4 (15.40)	-	1 (3.90)	2 (7.70)	1 (3.90)
Weaving entrepreneur	13 (20.00)	2 (3.10)	7 (10.80)	4 (6.10)	-
Total	38 (15.10)	3 (1.10)	8 (3.20)	7 (2.90)	10 (4.00)

Figures within parantheses represent the percentage of total number of different group of entrepreneur included in the survey.

2.7 Land Ownership

Land is the most dominant production force in sericulture. The size of sericulture enterprise depends mainly on the size of land under mulberry production. As such bigger the size of ownership of land bigger will be the size of land under mulberry cultivation and consequently bigger will be the sericulture enterprise and sericulture income. Moreover land used for other purposes also adds to the economic condition of sericulturists. Because he invests the income earned from the land used for other purposes, for sericulture. It is found in the present survey that about 4% of working capital necessary for sericulture industry is obtained from agriculture (see table 4.6 in chapter 4 of this report). Thus, the ownership of land is an important determinant of the economic condition of sericulture entrepreneur.

Land ownership pattern of the sericulture entrepreneurs are shown in table 2.8. Average size of land per entrepreneur is 2.86 acres. This figure is widely varied for entrepreneurs performing different stages of sericulture activity. It is increasing continuously as one move from planting entrepreneurs to reeling entrepreneur.

TABLE 2.8

LAND OWNERSHIP* PATTERN

Size group of land	Planting entrepreneur			Rearing entrepreneur			Reeling entrepreneur			Weaving entrepreneur		
	Number of enter- prise	Land owned (acre)	Average land owned (acre)	Number of enter- prise	Land owned (acre)	Average land owned (acre)	Number of enter- prise	Land owned (acre)	Average land owned (acre)	Number of enter- prise	Land owned (acre)	Average land owned (acre)
0.33	4	0.79	0.20	23	5.48	0.24	-	-	-	8	1.01	0.13
0.33 to 0.50	4	1.32	0.33	18	7.25	0.40	-	-	-	1	0.38	0.38
0.50 to 1.00	4	2.83	0.71	21	14.53	0.69	4	3.05	0.76	4	2.32	0.58
1.00 to 2.5	4	6.66	1.67	32	51.54	1.56	7	8.59	1.25	8	11.00	1.38
2.5 to 5.00	1	2.66	2.66	22	72.38	3.29	3	9.99	3.33	13	43.05	3.25
5.00 to 7.5	-	-	-	13	74.63+	5.72	5	31.65	6.33	6	35.66	5.94
7.5 and above	1	16.33	8.17	12	148.29	12.36	8	131.64	16.46	2	18.00	9.00
Total	19	30.59	1.61	142	366.44	2.62	26	182.59	7.30	42	104.09	2.60

*Land ownership here includes only cultivable land.

Distribution of sericulture entrepreneur among different size group of land is also giving the same information that reeling entrepreneur owns more land than planting and rearing entrepreneur. As can be seen from Table 2.8 that more than 50% of reeling entrepreneurs belong to the land size group of 5 acres and more whereas about 18% of rearing entrepreneurs and only 10% of planting entrepreneurs own this big size of land. One thing is notice worthy here that there is a big difference in land ownership pattern among the reeling and weaving entrepreneur although both of their activities are manufactural in nature. The reason lies in the fact that for reeling enterprise land provides economic base as it starts from planting activity while for weaving enterprise cultivable land does not provide any economic base as it concentrates entirely in weaving activity. Whatever cultivable land he has, is used either for mango gardening or for other agricultural purposes or as in most cases for share cropping. Therefore, for weaving entrepreneurs size of income will be the main indicator of his economic position.

2.7.1 Land Under Mulberry Cultivation

In the present survey the total size of land under mulberry cultivation is calculated at 102.82 acres. This land is distributed among different groups of sericulture enterprises as evidenced in the Table 2.9. Weaving enterprise is excluded from the table as it does not have planting activity. It is shown in the table that the average size of land under mulberry cultivation is biggest for the reeling entrepreneurs and smallest for the planting entrepreneurs. This size is highly correlated with the size of land owned. The bigger the size of land owned, bigger is the size of land under mulberry cultivation. Coefficient of correlation between the size of land under mulberry cultivation and total size of land owned is estimated as follows:

$$r = 0.73$$

$$t = 5.10$$

Here r for r is highly significant showing that there is high correlation between the land owned and land under mulberry cultivation. But this is not true if we take into consideration the land under mulberry cultivation as percentage of land owned. As is evidenced from the Table 2.9 that this figure is the biggest for the planting enterprises who own the smallest size of land and smallest for the

TABLE 2.9

LAND UNDER MULBERRY CULTIVATION

Enterprise Type	Land owned (in acre)	Land under mulberry cultivation (in acre) per enterprise	Average size of land owned (in acre)	Average size of land under mulberry cultivation (in acre)	Land under mulberry cultivation as % of land owned
Planting enterprise	30.59	5.69	1.61	0.30	18.60
Rearing enterprise	366.44	55.85	2.62	0.46	17.97
Reeling enterprise	182.59	31.28	7.20	1.20	17.09
All	579.62	102.82	3.10	0.55	17.74

reeling enterprises who own the biggest size of land. This will be clearer if we look at Table 2.10 showing distribution of enterprise by size group of land owned and the proportion of land under mulberry cultivation by different size group. The table distinctly exposes the fact that the bigger the size of land owned the smaller is the proportion of land under mulberry cultivation. The reason behind this may be sought in the fact that the bigger is the land owned higher is the tendency to undertake other agriculture activity to avoid the risk of depending on a single source of income. Owner of the small land concentrates mostly on mulberry cultivation as he has little scope for other agricultural production. The cultivation of mulberry on their small land is more profitable than the cultivation of any

TABLE 2.10

FREQUENCY DISTRIBUTION OF ENTERPRISE BY SIZE GROUP OF LAND OWNED
AND PROPORTION OF LAND USED FOR MULBERRY CULTIVATION BY
DIFFERENT SIZE GROUP

Proportion of land owned for mulberry cultivation	Size group of land owned							Total
	Upto 0.33 acre	0.33 to 0.50 acre	0.50 to 1.00 acre	1.00 to 2.5 acre	2.5 to 7.5 acre	5.00 to 7.5 acre	7.5 acre and above	
Upto 10%	-	-	1	4	3	7	12	27
10 to 25%	-	-	-	15	14	18	10	47
25 to 50%	3	2	3	15	7	3	-	31
50 to 75%	12	5	14	8	2	-	-	41
75% and above	12	15	11	3	-	-	-	-
Grand total	27	22	29	43	26	18	22	187

other agricultural crops on the same land (profitability of mulberry plantation over other crop is shown in Table 9.5 in chapter IX). Another most important reason may be that for mulberry cultivation good quality high land is necessary the availability of which is limited. There is no certainty that big land owner will have such land in big quantity in his possession.

2.8 Gross of Income

Gross income from different sources namely, sericulture, agriculture, business and trade and other unspecified sources are calculated separately for each types of sericulture enterprise.

Net income of the sericulture enterprise was not calculated because of the unavailability of data on depreciation cost maintenance cost. In case of sericulture industry where volume of fixed assets is small, depreciation cost will not be high enough to make a significant difference between gross and net income.

Average size of yearly family income of the sericulture enterprise is presented in Table 2.11. As it would appear from the table that yearly family income per enterprise from the sericulture sector is increasing fastly as one moves from planting enterprise to weaving enterprise through rearing and reeling enterprise. Income of the planting enterprise performing only one stage of sericulture activity will be lower than that of the rearing and reeling enterprise performing two and three stages of sericulture activity respectively. But weaving enterprise performing also one stage of activity has the highest family income among the sericulture enterprises. The reason behind this is the simple fact that the weaving activity is the most manufactural in nature among the sericulture activity and average size of weaving enterprise both in terms of capital and labour (as is shown in the next two chapters) is larger than that of the planting, rearing and reeling enterprise. It is observed from the table that gap between the income of the rearing enterprise and that of the reeling enterprise is very wide indicating a fact that the adoption of the stages of reeling activity expand the size of enterprise both in terms of capital and labour which brings more income. Another reason is that silk yarn which is the final product of the reeling activity deserves very high price and as such reeling activity brings high return to the enterprise. But income gap between planting and rearing enterprise is not significant. It may be due to the fact that rearer is to sell cocoon to the Sericulture Board (cocoon marketing policy of the Sericulture Board is described in chapter VII) through a chain of middle man who takes away a lion share of his income.

An interesting fact will be revealed if total income received from various sources is taken into account. Various sources of income are shown in the same Table 2.11. It is observed from the table that total yearly income of the planting enterprise which it receives from sericulture, agriuculture, casual labour, service and business is bigger than that of the rearing enterprise received from the same sources. It seems here that time and energy spent for casual labour, service and business brings more income than that spent for cocoon rearing.

TABLE 2.11

FAMILY INCOME (TK.) PER SERICULTURE ENTREPRENEUR
PER YEAR RECEIVED FROM VARIOUS SOURCES

Enterprise type	Sericulture	Agriculture	Casual labour	Service	Business	Others	Total
Planting enterprise	2048	1793	1032	734	1432	13	7052
Rearing enterprise	2382	2765	420	218	416	130	6331
Reeling enterprise	11176	6793	-	211	2185	1576	21941
Weaving enterprise	30078	1338	-	-	242	217	30911
Total	10337	2739	314	202	630	2929	14514

The table 2.11 also shows that the reeling enterprise receives a large amount of income from the sources of agriculture and business. Income from these sources are very small for weaving enterprise in comparison to that of the reeling enterprise. It is mainly because of the fact that weaving entrepreneur and his family member have little time to spend for these purposes as weaving is a round the year job.

2.9 Occupational Status

Occupational status of the sericulture entrepreneurs is presented in the Tble 2.12. Sericulture industry excluding weaving activity provides primary income to 81% of sericulture entrepreneur. Among them reeling entrepreneur is the highest in number to receive primary income from sericulture sector. As it would appear in the Table 2.12 that more than 92% of the reeling entrepreneur are primarily occupied with sericulture activity whereas these percentages are 52.6 and 82.4 for planting and rearing entrepreneurs respectively. More than 73% of the reeling entrepreneurs have secondary occupation of which agriculture is the main. Sericulture provides secondary occupation only to about

OCCUPATIONAL STATUS OF THE SERICULTURE ENTREPRENEUR

(Figures in percentage)

Types of occupation	Planting entrepreneur			Rearing entrepreneur			Reeling entrepreneur			All					
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary			
Sericulture	52.63	42.11	5.26	82.39	17.61	-	92.31	7.69	-	100.00	-	-	85.71	13.89	100.00
Agriculture	15.79	21.05	-	10.56	38.03	1.41	3.85	57.69	3.85	-	32.31	1.54	7.54	35.32	1.59
Mango gardening	-	-	-	-	-	9.86	-	-	11.54	-	4.62	-	-	1.19	6.75
Trade and business	10.53	-	5.26	2.11	11.27	-	3.85	3.85	7.69	-	3.08	-	2.38	7.14	1.19
Wage labour	15.79	21.05	10.53	4.23	18.31	3.52	-	-	-	-	-	-	3.57	11.90	2.78
Service	5.26	5.26	-	0.70	0.70	1.41	-	3.85	-	-	-	-	0.79	1.59	0.79
Others	-	-	-	-	2.82	0.70	-	-	-	-	-	-	-	1.59	0.00
Total	100.00	94.74	21.05	100.00	88.00	16.90	100.00	73.08	23.08	100.00	40.01	1.54	100.00	72.62	100.500

8% of the reeling entrepreneurs. A little more than 23% of the reeling entrepreneurs have tertiary occupation among which mango gardening tops the list.

Table 2.13 shows that sericulture provides primary job to 82% of the rearing entrepreneurs. The rest 18% of the rearing entrepreneurs receive primary income from either agriculture, trade, business, or service etc. As large as 88% of the rearing entrepreneurs have subsidiary occupation among which agriculture and casual labour is dominant sources. It is interesting to notice from the table that in all more than 47% of the planting entrepreneur and 26% of the rearing entrepreneur receive income from casual labour while not or single reeling entrepreneur receives income from this source.

Among all groups of sericulture entrepreneurs, planting entrepreneurs are the smallest in number to receive primary income from sericulture. As is mentioned before that about 53% of the planting entrepreneurs are primarily occupied with sericulture activity. Second important primary occupations among the planting entrepreneurs are agriculture and wage labour.

The relation between size of land, size of family and occupational status is presented in Table 2.13. It could be observed from the table that it is the size of land ownership decide the nature of occupation of the sericulture entrepreneur.

As it would appear from table 2.14 that the sericulture entrepreneurs belonging to the smallest and the biggest size group of land are in most cases, secondarily occupied with sericulture activity while the entrepreneur belong to the medium size group of land (between 1 acre to 2.50 acres) are mostly occupied primary with sericulture activities. The reason behind this may be sought in the fact that sericulture entrepreneur belonging to the smallest size group of land can not earn livelihood for the family member from cultivating mulberry on that small land. Therefore he is engaged secondarily with sericulture activities. The reason for biggest land size group for their being involved secondarily with sericulture activities is mainly the fact that supply of land

OCCUPATIONAL STATUS

(figures in percentage)

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suitable for cultivation of mulberry is limited. Therefore the entrepreneurs owning big size of land can not increase land under mulberry production and thereby **can not** enlarge his enterprise to engage profitably all his family members in sericulture activities. Therefore he is primarily involved with agriculture which brings larger income from his big land than sericulture. It seems both size of land and family determine the occupational status of sericulture entrepreneur.

All sericulture entrepreneurs belong to the land size group of 0.50 /1.00 acres are primarily occupied with sericulture activity. It may be mentioned here, that the size of family and size of land in this group of entrepreneurs are balanced to each other in such a way that there is no excess land and labour after performing sericulture activity.

CHAPTER III

CAPITAL AND TECHNOLOGY

3.1 Structure and Composition of Fixed Assets

Fixed assets of the sericulture enterprise consist of various tools, equipment and machineries which are mostly hand and foot-operated. Fixed assets of the sericulture enterprise exclude planting tools as these are not used exclusively for mulberry planting. Land, and workshop are very important in the fixed assets. But in the present study these items are excluded while calculating fixed assets on the following considerations.

i) Average price of the land transacted in the area and the value of the part of workshop are not available in most cases.

ii) In most of the enterprises under study the workplace and residence are found to be one and the same or are so mixed up as not easily be separated from each other. As such, it is difficult to impute a price to the part of the residence of entrepreneur where production activities are carried on.

iii) All most all weaving enterprises at Mirpur of Dhaka city do not own their industrial premises and work in rented premises.

Under these circumstances valuation of land and workshop is a difficult task. However, valuation of the rearing room without its base land is possible as in most cases it is found that rearing room is exclusive of any room and used for rearing purpose only. As such valuation of rearing room is done on the basis of the price it fetch in the market if sold.

Valuation of fixed assets was also done on the basis of the price it deserves while selling in the market. The price was as stated by the entrepreneur. Table 3.1 shows the structure of fixed assets of the sericulture enterprises.

TABLE 3.1

STRUCTURE OF FIXED ASSETS (EXCLUDING LAND AND WORKSHOP)

Types of Assets	(Value in Taka)											
	Planting entrepreneur			Rearing entrepreneur			Reeling entrepreneur			Weaving entrepreneur		
	Total	As % of total	Value of fixed assets per enterprise	Total value	As % of total	Value of fixed assets per enterprise	Total value	As % of total	Value of fixed assets per enterprise	Total value	As % of total	Value of fixed assets per enterprise
Rearing room	-	-	-	315000	64.20	2218.30	328000	76.59	1215.38	-	-	-
Chandarkin	-	-	-	34666	7.06	244.12	21425	5.00	824.03	-	-	-
Rearing self	-	-	-	128533	26.20	905.16	46402	10.83	1784.69	-	-	-
Other rearing tools	-	-	-	12384	2.54	87.21	7000	1.63	269.23	-	-	-
Khatghai	-	-	-	-	-	-	23350	5.21	859.61	-	-	-
Other reeling tools	-	-	-	-	-	-	3050	0.71	117.30	-	-	-
Handloom	-	-	-	-	-	-	-	-	-	585650	-	9010
Semi-automatic loom	-	-	-	-	-	-	-	-	-	12000	-	184.61
Automatic loom	-	-	-	-	-	-	-	-	-	-	-	-
Jory machine	-	-	-	-	-	-	-	-	-	40000	-	615.38
Tana dram	-	-	-	-	-	-	-	-	-	8000	-	123.07
Other	-	-	-	-	-	-	-	-	-	19663	-	293.27
Weaving tools	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	490583	100.00	3454.79	428227	100.00	16470.24	664713	100.00	10226.33

Fixed assets of the rearing enterprises consist of chandarki, rearing self, rearing room and other rearing tools. As is noticed from the table that most of the fixed assets of the rearing enterprises accounts for rearing room. It accounts for more than 64% of the total value of fixed assets of the rearing enterprises. Next important component of the fixed asset for them is rearing self which accounts for 26% of the total fixed assets. Rearing self consists a maximum of 16 rearing trays each of which costs about Tk. 25. Chandarki or spinning tray accounts for a little more than 7%. Other rearing tools consisting of net, knife etc. accounts for only 2.5%.

Fixed assets of the reeling enterprises consist of all rearing tools described above and reeling tools consisting of Khatghai and other reeling tools. It is interesting to note that rearing room accounts for as large as 76.6% of the total value of fixed assets. Reason behind this is that in most cases it is found (as is shown in Table 3.2) that the rearing room of the reeling enterprise is pacca and naturally the value of rearing room of the reeling entrepreneur will be more

TABLE 3.2

CONDITION OF REARING ROOM

Enterprise Type	Pucca		Area per enterprise (in sq. ft.)	Katcha		Area per enterprise (in sq. ft.)
	Percent- tage of enter- prise	Total area (in sq.ft.)		Percent- age of enter- prise	Total area (in sq. ft.)	
Rearing enterprise	17	6627	276	83	27585	234
Reeling enterprise	27	3060	437	73	7615	401
Total	18	9687	312	82	35200	257

than that of the rearing entrepreneur who in most cases has katcha rearing room. In many cases rearing room has no separate identity and attached to dwelling house and as such little special arrangement, particularly for rearing purpose, is there. But no numerical information in these respect is possible to give as detailed information as to the rearing house were not collected in the present survey. Whatever information as to the condition of the rearing room available in the present survey are presented in the Table 3.2. As it would appear from the table that 18% of the enterprise performing rearing activity has pucca rearing room. Among them reeling enterprise is largest in number to have pucca rearing room. Area per enterprise is larger for reeling enterprise than that for rearing enterprise in both cases of pucca and katcha rearing room.

Fixed assets of the weaving enterprise consist of loom, jory machine, tana dram and other weaving tools such as charka, latali etc. Handloom accounts for the maximum share of the fixed assets of the weaving enterprises. There are only three semi-automatic looms and no automatic loom. Only two enterprises have jori machine and only one enterprise has tana dram. Fixed assets per weaving enterprise is Tk. 10,226. This will be even less if jory machine and tana dram which are highly expensive and owned by only three enterprises are excluded from fixed assets.

The Table 3.1 shows that fixed assets per enterprise is higher for reeling enterprise than that for weaving enterprise. But it is mainly because of the fact that fixed assets of weaving enterprise exclude workshop while fixed assets of reeling enterprise include the value of rearing room which accounts for a large amount in its fixed asset.

3.2 Requirement of Working Capital

In case of sericulture industry, where production is mainly seasonal working capital is calculated just as to the requirement of the season instead of a year. Working capital in this report includes

TABLE 3.3

REQUIREMENT OF WORKING CAPITAL

Enter- prise Type	P u r p o s e s										
	Planting		Rearing		Reeling		Weaving		Total		Total
	Per- enter- prise	Per acre	per enter- prise	Per acre	Per enter- prise	Per Khat- ghai	Per enter- prise	Per loom	Per enter- prise	Per acre	Per Khat- ghai/ loom
Planting enterprise	405	1353	-	-	-	-	-	-	405	1353	-
Rearing enterprise	768	1436	924	1882	-	-	-	-	1692	3318	-
Reeling enterprise	2016	1591	3424	2845	6024	3073	-	-	11464	4437	3073
Weaving enterprise	-	-	-	-	-	-	20571	5027	20571	-	5027

(i) stocks of raw materials (ii) stock of finished and semi finished goods
 (iii) cash at hand and bank and (iv) payment due from purchaser of the product.
 Working capital of sericulture enterprise required for different stages of
 sericulture activities is shown in the Table 3.3.

As is evidenced by the Table 3.3 that the reeling enterprises require the higher amount of working capital per acre for planting and rearing purposes than planting and rearing enterprise. It may be explained by the simple fact that the reeling enterprises employ more hired labour and a little more capital intensive method of production than that employed by the planting and rearing enterprises. Working capital requirement per enterprise is the highest for weaving activity as weaving is the most capital intensive among the sericultural activities.

3.3 Technology

Level and nature of technology involved at different stages of sericulture activity is different. Because stages of planting and rearing are agricultural in nature while stages of reeling and weaving are manufactural in nature. As such technologies involved at different stages are discussed separately as follows:

3.3.1 Technique Used in Mulberry Plantation

Mulberry leaf is the sole food of the silk worm. Hence, the growth of the silk worm and the quality of the cocoon depends largely on the freshness and ~~nutrition~~ of the mulberry leave. Quality and quantity of mulberry leave, on the other hand, depends on the technique used in mulberry plantation. Technique of plantation must incorporate adoption of HYV of mulberry plant, timely application of balanced fertilizer and systematic irrigation. Besides chemical fertilizer, the influence of manure on the mulberry land is very important. Systematic irrigation also is very important for mulberry plantation. Experiment proved that the silk worm which consumes mulberry leaves produced in the irrigated land give cocoon of high silk content.

Quality and quantity of various types of inputs used in mulberry plantation will give an idea about the technique used in mulberry production. Number of sericulture entrepreneur using different types of input in mulberry cultivation is shown in Table 3.4. As is evidence from the table that not a single entrepreneur uses high yielding varieties of mulberry cutting. The nurseries are supposed to supply high yielding varieties of mulberry cutting. ^{no} plantation of HYV takes place in the nurseries. No research is also of mulberry cuttings to the cultivator. But still now almost/carried out to introduce better varieties of mulberry suiting best our climate and soil. Presently, nurseries are supplying local varieties of mulberry cuttings which are used for bush type mulberry plantation. Presently, bush type mulberry plantation is becoming popular/^{among} the sericulturist in Bangladesh. As it would be observed from Table 3.4 that all mulberry planters are growing bush type mulberry plant. Production in this system of plantation will increase several times if this system is adopted in large scale and if high yielding varieties is planted with proper application of fertilizer and irrigation.

TABLE 3.4

NUMBER OF SERICULTURE ENTREPRENEUR USING DIFFERENT
TYPES OF INPUT IN MULBERRY CULTIVATION

Types of input	Planting entre- preneur	Rearing entre- preneur	Reeling entre- preneur	Total
HYV mulberry cutting	-	-	-	-
Bush plantation	19 (100)	142 (100)	26 (100)	187 (100)
Tree plantation	6 (32)	48 (34)	11 (42)	65 (34)
Chemical fertilizer	-	57 (40)	16 (62)	73 (39)
Manure	19 (100)	142 (100)	26 (100)	187 (100)
Local irrigation	3 (16)	8 (6)	2 (8)	13 (7)

Figures within parentheses upto column 3 are percentage of entrepreneur belonging to different groups of sericulture activities. Figures within parentheses in the column 4 are percentage of the total of all entrepreneur cultivating mulberry leaves.

Research on the quantity of irrigation and fertilizer to be applied in the mulberry land in Bangladesh is yet to be completed. But the following composition of fertilization and irrigation is suggested in the "Feasibility study for a Bangladesh - Swiss development project in Sericulture" which could increase production by 84% with necessary quality¹.

¹/ "Feasibility Study for a Bangladesh - Swiss Development project in Sericulture", Report made by P. Kuenzi K. Sengupta, L.V. aptharishi, December, p. 12.

Nitrogen at the rate of 300 lbs/acre
 Phosphorous at the rate of 100 lbs/acre
 Potash at the rate of 200 lbs/acre
 Compost or farmyard manure at the rate of 20,000 lbs/acre
 Fortnightly irrigation at the rate of 1.8 acre - inch.
 during November to May.

Use of fertilizer per acre has been shown in Table 3.5. As it would appear from table that fertilizer per acre used in the area surveyed is far below the suggested amount. All entrepreneurs use chemical fertilizer. Among them planting entrepreneurs use chemical fertilizer per acre in the highest quantity. They also use manure per acre in the highest quantity. But production per acre as shown in the last column of the table is not the highest for planting enterprise. It may be due to mismanagement and missupervision as most of the planter take mulberry plantation as their subsidiary occupation. In many cases chemical fertilizers used is not in right proportion.

TABLE 3.5

USE OF FERTILIZER "PER ACRE"

Entrepreneur type	Use of chemical fertilizer per acre (in maund)	Use of composed manure per acre (in no.of cart)	Production per acre (in maund)
Planting entrepreneur	2.55	54.13	221
Rearing entrepreneur	2.12	40.4	264
Reeling entrepreneur	2.37	35.97	210
Weaving entrepreneur	-	-	-

Mulberry plant is frequent attacked by various diseases like powdery mildew, tangro etc. It is also attacked by various insects like fibre worm, sucker worm, scorpion etc. But no measure is taken yet to protect mulberry from disease and pests. As a result a large portion of mulberry leaves are spoiled every year.

The table 3.4 shows that only 7% of the sericulture entrepreneurs use local irrigation. No one use mechanised irrigation on mulberry land. Thus mulberry cultivation in Bangladesh almost entirely depends on rain water which is neither regular nor proportional to necessity. The result is low productivity of inferior quality mulberry leaves.

3.3.1.1 Problems Involved in Improving the Technique of Mulberry Cultivation

The problems reported by the entrepreneurs cultivating mulberry leaves are described in Table 3.6. As it would appear from the table that as large as 62% of the sericulture entrepreneurs engaged in mulberry production face the problem of the lack of irrigation facilities. Next important problems they face are the lack of fertilizer. Nobody said that they face the problem of lack of HYV and lack of insecticides in required quantity. In fact, in the present survey not a single entrepreneur has been found using HYV and insecticides. The sericulture entrepreneurs in Bangladesh do not understand the importance of using HYV and insecticides in mulberry plantation. They do not even know that there is high yielding mulberry variety which can increase their production several times.

No attempt has been undertaken so far, to improve the technique of mulberry cultivation. The Govt. of Bangladesh has ambitious plan to increase the mulberry acreage as the prerequisite for expansion of mulberry production. The Govt. could little realise the fact that production of mulberry can be increased several times by applying fertilizer and irrigation on the same land. The increase mulberry

TABLE 3.6

PROBLEMS INVOLVED IN IMPROVING THE TECHNIQUE OF
MULBERRY CULTIVATION

Entrepreneur type	(Figures in percentage)				
	Problems				
	Lack of fund	Lack of fertilizer	Lack of irrigation	Natural calamity	Others
Planting entrepreneur	26.3	42.0	57.9	-	10.5
Rearing entrepreneur	9.9	19.0	60.51	5.6	3.5
Reeling entrepreneur	7.7	15.4	73.1	3.9	11.54
Total	11.2	20.9	62.0	4.8	5.5

production by increasing acreage is a bit difficult as there is limited supply of land suitable for mulberry cultivation. Moreover, whatever land is available already is under cultivation of any type. So, increase of mulberry acreage will face competition with other agricultural crops. Therefore, to increase mulberry production prior importance should be given on supply of fertilizer, irrigation and pesticides rather than on the increase of acreage under mulberry production.

3.3.2 Technique Used in Cocoon Rearing

Quality and quantity of cocoon depends on the technique used in rearing. Both quality and quantity of cocoon produced in Bangladesh is inferior to those produced in countries developed in sericulture industry. Bangladesh with her low productivity of inferior quality cocoon cannot compete even with India her neighbour country where both quality and quantity of cocoon is several times higher than that of Bangladesh. The reason responsible for low productivity and inferior

quality of cocoon in Bangladesh is the traditional technique used in rearing.

3.3.2.1 Rearing Appliances

Silk worm rearing is a biological process. As such it demands certain specified environmental condition particularly as regards temperature and humidity. Rearing house which is the main rearing appliance should be planned and constructed to provide and maintain proper environmental conditions to ensure good quality cocoons. A model rearing house, as is pictured in a Sericulture Manual published in the FAO Agricultural Service Bulletin¹, is a rat proof building with a ledge all around to prevent rats from entering the building. The building has a verandah all around having glass windows and doors to provide good ventilation and light. The ceiling of the rearing house is generally made of wood; if made of concrete or tiles a false ceiling must be constructed. Ventilator must be installed to ensure free circulation of air^s. The rearing house is partitioned into four convenient rooms in one of which high temperature and humidity is maintained to rear the young age silk worms. Other rooms are provided with an adequate number of windows and doors to ensure good ventilation for rearing older silk worms at different stages. The rearing houses should be located in such a manner as to maintain as far as possible ideal temperature and humidity conditions inside the rearing rooms. In tropical region building should be sited east-west so that too hot direct sunlight is avoided and cooler room temperature is maintained.

Condition of the rearing houses in Bangladesh is very poor in comparison with the model rearing house described above. Rearing house lacks many of the facilities described above. In many cases it is not well ventilated rat proof building. In not a single case there is glass windows and doors in the rearing houses. But no numerical

¹/Sericulture Manual 2 - Silk Worm Rearing, By Dr. S. Krishnaswami. Sr. M.N. Marasimhanna, Sri, S.K. Suryanarayan, Sri. S. Kumararaj Central Sericultural Research and Training Institute, Mysore, India, FAO Agricultural Service Bulletin 15/2, pp. 55-56.

information in these respects is possible to give as detailed informations as to the rearing house were not collected.

Other rearing appliances such as rearing shelf, rearing tray, spinning tray, net etc. are of poor condition. In many cases these appliances are not in required number. The rearer has to rent some of these rearing appliances and face every problem involved in renting. Each rearing shelf leg must rest in the concrete or stone well to stop ants crawling on to the rearing trays and attacking the silk worm. But not in a single case such well is used to prevent ant's attack. Chop stick should be used to pick early stage larvae to avoid direct handling of young age worm for hygienic reasons and to prevent damage to young worm. It is seen in the present survey that not a single enterprise used this appliance and picking is always performed by hand and result is unhealthy growth of silk worm.

Rearer in Bangladesh does not use many other rearing appliances which are necessary for healthy growth of silk worm. One important appliance among them is thermometer-hydrometer which is necessary to record the temperature and humidity of the rearing room.

Proper preservation of the freshness of mulberry leaves matters much in silk worm rearing because leaves that lose moisture are not well relished by the silk worm and as a result they are not nourished properly. Moreover, when leaves lose freshness it also loses some protein content. Therefore, of utmost importance is, that leaves be harvested and preserved in as fresh a state as possible before being fed to silk worm. Sericulture entrepreneurs in Bangladesh give little emphasis on proper preservation of mulberry leaves. In Bangladesh where leaves wither very fast because of high temperature preservation of leaves must receive extra importance. To retain the freshness mulberry leaves should be stored in leaf chamber which is covered on all the sides with wet gunny cloth. In absence of leaf chamber leaves should be stored in cool room covering with wet cloth or polythene sheets. But only in few cases leaves were found to be preserved in such ways.

3.3.2.2 Use of Different Varieties of Laying

Quality and quantity of silk content in the cocoon depend to the greatest extent on the variety of laying used in rearing. Local multivoltine variety of laying produces cocoon with less silk content but matures in shortest possible time. High yielding variety of bivoltine race which is known as foreign variety in Bangladesh produces cocoon with high silk content of high quality. But it takes long time to be matured and consumes more leaf than local variety. Another variety known as F-1 hybrid produced by cross breeding between foreign race and indigenous race is getting popularity among the rearer in Bangladesh. This variety can be reared throughout the year whereas foreign variety is reared only in the winter. F-1 variety also produces high quality cocoon with high silk content. As is evidenced from Table 3.7 that almost all enterprises rear local variety. Only 2.4% of enterprises who do not rear local variety and rear only F-1 hybrid. Share of foreign variety and F-1 hybrid in the total use of variety are 6.45% and 20.9% respectively. These figures are higher for reeling enterprise. For them about 3% of total use of laying accounts for foreign variety and about 13% accounts for F-1 hybrid. Reeling enterprise being economically more solvent than rearing enterprise can provide all requisites for rearing high yielding variety.

3.3.2.3 Collective Rearing

Silk worm not reared properly in young age are prone to diseases at later stages and crops may even fail. Individual rearer may not be able to afford necessary equipment and ideal atmospheric condition to rear young silk worm. To overcome these difficulties collective rearing centres are organized by the Bangladesh Sericulture Board. In the collective rearing centres young age silk worms are reared under ideal conditions and technical supervision of the Sericulture Board's expert upto the third age and in the fourth age worms are supplied to the rearer. But collective rearing is not getting popularity. During our field tour in the extension centre we heard many complains from the rearers. They complained that collective rearer does not supply

TABLE 3.7

TECHNIQUES USED IN REARING COCOON

Enterprise type	Percentage of enterprise using different varieties of laying			Use of different varieties of laying as percentage of the total use of laying			Percentage of enterprise US using temperature control		Percentage of enterprise using disinfectants
	Local	Foreign	F-1 hybrid	Local	Foreign	F-1 hybrid	Traditional	Improved	
Planting enterprise	-	-	-	-	-	-	-	-	-
Rearing enterprise	98.00	25.4	17.0	85.4	6.17	8.38	100	0.00	100
Reeling enterprise	96.00	34.6	57.7	74.5	7.9	17.6	100	0.00	100
Weaving enterprise	-	-	-	-	-	-	-	-	-
Total	97.6	26.8	23.2	82.66	6.45	10.90	100	0.00	100

vigorous and healthy worm. According to them the collective rearer keeps the healthy worm for himself and supply comparatively weak worm. They think price charged for third stage silk worm is very high. Profitability is less if they produce cocoon from the fourth stage silk worm. They think they can produce even healthier worm than collective rearer. The collective rearer also complained almost in the same tune that collective rearing is not profitable for them. They told that cost incurred in rearing silk worm upto third stage is not profitably covered by the price charge for third stage silk worm. In spite of all these complaints collective rearing must be continued and investigation should be undertaken to find out the reason of these complaints.

3.3.2.4 Sanitation

Since the mulberry silk worm is a domesticated variety of silk worm it is susceptible to diseases and attacked by pests and parasites. The production and supply of disease free laying which is the responsibility of the nurseries, is the most effective preventive method against disease and pest attack. Other general preventive measures are maintenance of proper sanitation, frequent and careful inspection of stocks for signs of infection and regular disinfection of rearing room and appliances. To maintain proper sanitation there should be regular bed cleaning through which old mulberry leaves exuviae, faecal matter, dead egg, any dead or unhealthy worm etc. are removed from the rearing bed. Accumulation of any such matter creates unhealthy atmosphere for silk worm rearing. Bed cleaning is done by every rearer in Bangladesh. But in most cases it is not regular. The result is unhealthy growth of silk worm. The expert of the Bangladesh Sericulture Board has the responsibility of inspection of stock frequently. But in many cases the investigator of the present survey had to hear the complain from the rearer that Sericulture Board's expert does not pay regular visit to the rearers house. In many cases it is also heard that Sericulture Board's expert is unable to make diagnosis of the disease of the silk worm due to lack of his pathological knowledge.

To get rid of any infection the use of disinfectants is important. With the use of disinfectant, rearing room, rearing trays, shelves and other rearing appliances should be thoroughly disinfected. As is shown in the table 3.7 that all rearers use disinfectants. Most commonly used disinfectants are formalin and bleaching powder which are distributed by the Sericulture Board free of cost. Sericulture Board's staffs are supposed to go to the rearers' houses with disinfectants and to spray the same in the rearing room and rearing appliance. During our field tour we have heard many rearer to complain that the Sericulture Board's staffs do not go to their houses with disinfectant regularly. In many cases the rearers have to wait long for their visit. The result is delay in rearing. And they can not produce as many crops as possible per year. In many cases the rearers are supplied directly by the

Sericulture Board with disinfectants. In these cases the rearers face with the problem of spraying. Most of the rearer don't have sprayer. They use hand to spray disinfectant. The result is uneven distribution of disinfectants. In many cases the supply of disinfectants is not up to the requirement.

Provision of adequate spacing both in the rearing room, rearing shelves and rearing trays is of great important for vigorous and full growth of silk worms. Most of the troubles in silk worm rearing in Bangladesh arises from a lack of appreciation of the importance of spacing. In most cases rearing room is crowded with rearing self. Due to shortage of rearing space the rearer always try to install in the same room as many rearing self as possible. An ideal rearing shelf accommodates 10 rearing trays with a space of 20 cm. between each shelf. In Bangladesh rearing shelf accommodates as many as 16 trays with a space of less than 10 cm. in between. The most detrimental condition is created when rearing bed or rearing trays are overcrowded with silk worm. There is always a tendency on the part of the rearer to rear as many layings as possible on the same rearing bed with the result of overcrowding. Overcrowding of silk worm results in insufficient space for the free movement and free feeding of the worm. The worm crawls over one another. Crowded condition also increases the accumulation of fermentation of faecal matter. Under such unhygienic condition the worms do not grow in proper weight and size and result is crop losses.

3.3.2.5 Problems Involved in Improving the Technique of Rearing

Table 3.8 shows different problems facing the rearer in improving the technique of rearing. As it would appear from the table that maximum number of enterprise reported that they face the problem of temperature control. They generally face this problem during the hot summer days. During summer they control temperature by using hand fan and hanging cartain dipped in water on the windows. But this method is insufficient when sun is too strong. In many cases silk worm dies due to excessive heat. In such cases our rearers with their traditional methods of

TABLE 3.8

PERCENTAGE OF ENTREPRENEURS FACING DIFFERENT PROBLEMS IN
REARING COCOON (AS REPORTED BY ENTREPRENEUR)

Entrepreneur type	Lack of fund	Tem- pera- ture	Rear- ing space	Lack of pro- per ser- vice from S.B.	Short supply of high yield- ing varie- ty layings	Short of dis- infec- tant mate- rials	High mor- tality of worms	Supply of infe- rior quality layings by S.B.	Other prob- lem
Rearing entrepreneur	46	52	10	30	45	44	21	38	54
Reeling entrepreneur	12	50	-	31	34	42	31	15	15
Total	41	52	8	30	40	44	23	35	49

temperature control is quite helpless. During winter the rearer faces light and ventilation problem. Because during winter they control temperature by closing the doors and windows and placing fire in the room. As it is mentioned earlier that in not a single case there is glass on the window and thus when doors and windows are closed little light can enter into the room. Light is of vital importance for silk worm rearing.

The second important problem they reported to supply of disinfectant. About 44% of the entrepreneur rearing cocoon face this problem. The Sericulture Board is the sole supplier of disinfectants. Therefore, the Sericulture Board is solely responsible for solving this problem. Lack of fund also is a big problem specially for rearing enterprises. About 46% of the rearing enterprises face this problem whereas only about 12% of the reeling enterprises face this problem. Next important problems are supply of inferior quality layings, lack of proper and timely services from the Sericulture Board, high mortality rate of mature worm (specially improved variety worm) delay in supplying

layings by the Sericulture Board etc. About 10% of the rearing enterprises complained about the shortage of rearing space whereas not a single reeling enterprise complained of such a problem.

It is already mentioned that very small number of enterprises rear improved variety layings. Apparently it means that enterprises are unwilling to rear improved variety layings. But the actual story is different. The rearers are very much eager to rear improved variety as it is highly remunerative. Table 3.9 shows that almost all rearing and reeling entrepreneur told that rearing of foreign and cross variety is advantageous as these varieties gives more yield per cocoon. Most of them also told that improved variety brings more price to them. Thus, naturally the rearer will be allured to rear improved variety cocoon. But a number of problems are involved in rearing improved variety cocoon. As Table 3.10 shows that entrepreneur willing to rear improved variety lying face in large number, the problem of shortage of supply of improved variety laying. The Sericulture Board is the sole supplier of disease free quality layings. In many cases rearer complained that they do not get supply of laying in proper time. Many also complained that there is unofficial payment system in getting

TABLE

TABLE 3.9

Entrepreneur type	Foreign variety			Cross variety		
	Higher yield	Higher price of cocoon	Others	Higher yield	Higher price of cocoon	Others
Rearing entrepreneur	119	15	1	118	15	1
Reeling entrepreneur	24	3	-	24	3	6
Total	143	18	1	142	18	7

TABLE 3.10

PERCENTAGE OF ENTREPRENEUR MENTIONING DIFFERENT
DISADVANTAGES OF REARING IMPROVE VARIETY LAYING

Entrepreneur type	Shortage of supply of improved variety laying	Longer period required to mature	Consume more leave	Allergic to summer	Higher mortality before spinning stage	Higher mortality at matured stage	Higher mortality at matured stage	Costly
Rearing entrepreneur	45	5	24.6	41.6	5	42	-	30
Reeling entrepreneur	34	-	19.2	77	4	27	4	8
Total	40	4.17	24	47	5	39.3	0.60	26.2

layings from the Sericulture Board. He, who makes this payment gets layings in time. Such a payee also gets superior quality laying. The production of improved variety laying in the nurseries is very low. Therefore, competition involved in getting improved variety laying is very tough and the entrepreneurs who can make unofficial payment win the race. Higher mortality of improved variety silk worm is another problem which discourages the rearer to rear improved variety. The Sericulture Board is responsible to supervise the rearing of silk worm. If there arises any kind of disease or mortality the Sericulture Board is supposed to take immediate preventive measures. But the irony of fate is that in most cases Sericulture Board's expert is unable to diagnose the disease. Experts are even unable to find out the reason of mortality at mature stage.

It is interesting to note here that most of the problem described above is created by the Sericulture Board. Thus, Sericulture Board alone can solve most of these problems.

3.3.3 Technique Used in Reeling

In Bangladesh both filature reeling and cottage reeling are practised. More than half of the cocoon produced in the country is reeled in the mechanised filature of the Rajshahi silk factory. The filature establishment in Thakurgaon (in the Dinajpur District) silk factory also consumes a portion of total cocoon production. Less than half of the total cocoon production are reeled in the cottage establishment of individualistic character. The reeling industry of cottage type has neither a set pattern of organisation nor has a standardised equipment and production technique. Generally the cottage establishment of reeling uses cheap and simple reeling appliances obtained locally. The appliances are either foot powered or hand driven. The processes of reeling namely drying, storing and boiling in the cottage establishment, are also performed with the help of simple appliances and simple method. Let us have a short description of the techniques used in reeling industry in Bangladesh.

3.3.3.1 Processes of Reeling

Good quality cocoon has good reelability or higher recovery of silk and not drop off frequently due to filament break. It is true that this quality of cocoon depends largely on the variety of cocoon reared and on the care taken during cocoon rearing. But reelability of cocoon is also considerably influenced by the method followed in processing the cocoon before reeling. Processes of reeling include sorting, drying, storing and boiling.

a) Sorting

After cocoons are harvested all the bad cocoons should be picked out from the good cocoon. It is noticed during the present survey that in most cases sorting is not done properly. The main reason for this is the fact that sorting is done by the rearing enterprise who tries his best to conceal the bad cocoon between the good ones so that he can have the same price for bad and good cocoon. He is also supposed to remove from the cocoon adhering direct matter like silk worm litter

straw etc. But in fact he does not do this as it will decrease the weight of cocoon. He dares not to sort out the bad cocoon because in Bangladesh there is absence of determined standards of quality for cocoon and there is lack of standard methods of testing for classifying cocoon into quality grades. Here cocoons are classified into quality grades only when the Sericulture Board purchase cocoon. Sericulture Board purchase more than half of the total production of cocoon and the quality grading is done only for that amount of cocoon. The other half of the cocoon are sold to the private reeler without grading. Sericulture Board classifies cocoons into quality grade mainly according to the variety of cocoon and also according to the weight of a sample cocoon. It is not aware of the fact that quality will differ due to absence of proper sorting. The reeling enterprise suffers a lot from the absence of proper sorting and determined standard of quality. It is described in chapter VII of this report that the reeling enterprise has to buy about 60% of its total requirement of cocoon from the market. But the enterprise has no quality control on this amount of cocoon. Thus the proper selection of cocoon becomes a difficult job for reeling entrepreneur. Generally he estimates the quality of cocoon by application of empirical methods determined from generations of experience. But in many cases estimation does not hold good. It is very difficult for the reeler to identify the inside stained cocoon and melted cocoon. It is only possible if he knows when the cocoons are harvested. Hence, the integration between rearing and reeling activity is of utmost importance. If the reeler has full control on the rearing activity, the proper selection of cocoon for reeling purpose could be an easy job. Proper selection of cocoon will increase both quality and quantity of silk yarn.

b) Drying

Cocoons immediately after harvesting and sorting need to be dried. Because cocoons in fresh condition can not be kept for a long time as the living pupae in them are soon transformed into moth and emerge from the cocoon piercing the silk shell through one end. Pierced cocoons are useless for reeling silk yarn because the continuity of

the filament gets broken. There re, in any way pupae should not be allowed to be transformed into moth. Drying of cocoon aims at killing the pupae and drying the pupae in such a condition so that there remain no moisture in the form of body fluid. If there is moisture the cocoon in the lower layer gets crushed as the pupae begins to decompose. In Bangladesh sun-drying is practised for killing and drying pupae inside the cocoon. Immediately after the harvest of cocoons they are thinly spread out on mats and kepts in the scorching hot sun from sun rise to sun set. It is repeated for several days till the pupae are killed and completely dried. Sun-drying is possible only when there is bright and hot sun continuously for several days soon after cocoon harvest. In Bangladesh it is possible only in the winter which lasts only three months. During the rest nine months of the year there is no certainty of sun shine continuously for several days. It would be found later that most of the reeling enterprises mentioned that drying is a serious problem for them in the absence of sure sunlight. In many cases pupae gets decomposed as the cocoon is partially dried. Drying is mainly done by the rearing enterprises who usually do not want that pupae gets completely dried as it reduces weight of the cocoon. Here again arises the necessity of integration of rearing and reeling activity so that the interest of the rearer and the reeler is interlinked.

c) Storing

Next to drying the process of storing takes place. The dried cocoon are to be stored till it is boiled for reeling purpose. Storage of cocoon is an important problem which the sericulture enterprises in Bangladesh face seriously. Store room must have good ventilation and should be kept dry so that cocoons do not get damp. But in Bangladesh there is no room used particularly for storage purpose. Generally cocoons are stored either in the dwelling rooms or in the rearing room. Cocoons are kept in the basket made of bamboo. Both the room and the container of the cocoon are not well protected from pest, rats etc. which are very common in the tropical country like Bangladesh. Thus, at every harvest, considerable amount of cocoon is damaged by pest pests and other insects. Another sources of damage to cocoon in storage

comes from the high humidity of the store room. The climate of Bangladesh is highly humid. But no care is taken to maintain proper humidity in the room and thus cocoon gets damp. The problem of storing can easily be solved if the cocoons are bought and sold in green condition that is immediately after harvest. But no marketing of cocoon takes place untill and unless the Sericulture Board buys its share of cocoon from the cocoon rearer. It is described in Chapter VII how the Sericulture Board creates problem in the cocoon marketing. The Sericulture Board takes long time to decide how much cocoon it will buy for filature reeling in the Rajshahi silk factory. Moreover, there is a long chain of buying agents between Sericulture Board and the seller of the cocoon. As such, the seller of the cocoon has to hold cocoon for a long time after harvest. The local reeler could easily buy cocoon in green conditions. But they are restrained from buying cocoon by the restrictions imposed by the Sericulture Board in the cocoon market. Even the local reeler cannot use himself produced cocoon unless and untill the Sericulture Board finish its purchase of cocoon. As a result the cocoons in the bad storage system get damaged. Storage would have been undertaken with great care if the storing and reeling are done by the same group of enterprise. In reality in most cases these two activities are done by two groups of enterprises whose interests are different from each other. Here again arises the necessity of integration of rearing and reeling activity into one enterprise.

d) Boiling

Boiling is the most important process of reeling. The quality of raw silk is greatly influenced by the technique adopted in boiling the cocoon. Boiling or cooking of cocoon aims at degumming the silk filament by putting the cocoon in hot water. When the cocoon gets soft due to cooking it needs brushing for separating the entangled floss layer of the cocoon from the end of the reelable filament.

Proper boiling and brushing of cocoon is a skilled operation. Both over boiling and under boiling of cocoon causes wastage of silken material. Therefore, the reeler must be careful about the proper cooking

of cocoon. Proper cooking becomes easy for him if he has a complete understanding of the nature of the cocoon and the construction of the cocoon shell. But in Bangladesh little research is there on silk protein. The reeler has no access to whatever little research is there. Thus, the reeler has little knowledge about the properties of cocoon. Whatever knowledge he has about the construction of cocoon he gains it from generations of experience.

The method of boiling of cocoon in Bangladesh consists in boiling cocoon in the ordinary open pan made of earthenware. Water is poured into the pan and put on the fire. Fire is made by using local fuel like root of the tree, thick wood etc. When the water begins to boil a handful of cocoon is put into the boiling water and kept immersed in water for a few minutes by pressing down with a perforated ladle so that all parts of the cocoon get cooked evenly. Then brush is used to find out the filament for reeling. When reeling is going on cocoons remain in the pan soaked in hot water. The temperature of the hot water remains the same throughout. Hand brush with hundreds of bristles is used for brushing purpose. This method of cooking has possibilities of both over-cooking and undercooking. The outer layer of the cocoon in contact with hot water get cooked earlier than the middle or inner layers and if the cooking is continued till these layers also get properly cooked the outer layer gets over cooked. Whereas if the reeling starts soon after the outer layers are cooked, reeling becomes difficult when the undercooked middle and inner layers are reached. In either case wastage of silk increases. The reelers, however, overcome this problem to some extent by keeping the reeling water at a high temperature. But keeping water at high temperature adds to the cost of fuel and causes many hygienic inconveniences to the reeler as he has to stay always before the fire of high temperature. It will be found latter that most of the reeler states that fuel and cost of fuel is a big problem for them. In the present system of cooking and brushing are done in the same small pan. As a result the dirt and deteriorious substances released from the cocoon makes the water dirty very soon. As such it needs regular draining of dirty water from the pan and adding of fresh water into the pan. It also adds to the fuel cost. Reeling delays in

this system of cooking as the cooked cocoon cannot be supplied continuously. Moreover, in this system cooking and reeling is done by the same person and as such the reeler cannot concentrate entirely on reeling.

3.3.3.2 (a) Reeling

After the finish of all these four processes cocoon becomes ready for reeling through which silk filament of the cocoon is unwinded to form silk yarn. In Bangladesh hand reeling is practised both in private and public sectors of the reeling industry. In Rajshahi silk factory although the reels are driven by power and water is heated by steam the reeling is still done by hand. In the private sector all operations of reeling are done by manual power. The reeling machine known as "Khatghai" is entirely home built by the village carpenter and blacksmith and with material available locally. Fire place is built in front of where the "ghai" is placed. Chai has a wheel and a wooden traverse rod which is aligned parallel to the front side of the ghai machine and stands about 20 to 25 cm. above. The wheel is driven by an endless cord-belt from the reel passing over the wheel. There is only one reel made of thick section of season wood. The reel is rotated manually by a turner attached to the wheel. When ghai machine is in operation the wheel revolves on its vertical axis and drives the wooden traverse rod backward and forward. The traverse rod is provided with a number of belt wire along its length at regular intervals to serve as guide eye. The fineness of silk yarn depends to a large extent on the construction of guide eye. The wire belt used as guide eye is very crude in construction. As a result fineness of silk yarn produced in ghai machine is hampered a lot. When reeling is in progress the traverse rod moves to and fro to distribute the reeled silk on it in cross winding. This traditional nature of reeling machine hampers the rate of casting of filament which is the most important and skilled work of reeler. In this system of reeling the rate of casting is very low and slow. This puts a limitation on the number of ends reeler can manage resulting low production. The slow rate of casting also results in wide fluctuation in the thickness and fineness of raw silk. In addition to these defects the present system of reeling results in broken thread and

entanglement of hard gum spot. Thus, present system of reeling needs to be improved to increase both the production and to raise the quality of raw silk.

3.3.3.3 Lacing, Testing and Classification and Packing of Raw Silk

After the raw silk is reeled, it needs to be laced, classified and packed. All these systems are defective in the reeling industry of Bangladesh. Silk is laced loosely and as such the silk threads get entangled to a great extent in the subsequent process of handling. In Bangladesh there is no organisation responsible for testing and classifying of raw silk. The Sericulture Board has a department responsible for testing and classifying the raw silk. But this department perform this job only for the silk yarn produced in the Rajshahi silk factory. It has nothing to do with the silk yarn produced in the private sector. Silk is classified in the private sector by the number of count that is by thickness and thinness of silk thread. The thickness and thinness is found out by weighting a hank of thread consisting of 210 yards of silk thread. Thus, smaller the weight per hank the higher the count of silk thread and better the quality. But in this way whether the thickness and thinness is evenly distributed throughout the hank, cannot be found out.

3.3.3.4 Problems Involved in Improving the Technique of Reeling

During the present survey reeling entrepreneurs reported various problems that are faced by them in carrying out their reeling operation. All the problems are enlisted in Table 3.11. It can be seen from the table that largest number of reeler faces the problems of drying. The number of reeling entrepreneur facing the problem of storing and boiling is also large. High price of fuel and shortage of the supply of fuel are the important problems they face with the process of boiling. This is because of the fact that the system of boiling practiced in Bangladesh reeling industry is highly fuel consuming method. However, about 58% of the reeling entrepreneur mentioned that restriction imposed by the Sericulture Board on free reeling is a great problem for them. (Which has been discussed in chapter VIII).

TABLE 3.11

PROBLEMS FACED IN THE PROCESSES OF REELING

Problems	No. of reeling entrepreneur facing the problem	Percentage of reeling entrepreneur facing the problem
Drying		
	17	65.38
(a) Rain	6	23.08
(b) Insufficient sun	1	3.85
(c) Others		
Storing		
	2	7.69
(a) Shortage of space	12	46.15
(b) Damage of cocoon due to rats and insects	-	-
(c) Others		
Boiling		
	12	46.15
(a) High price of fuel	13	50.00
(b) Shortage of fuel supply	2	7.00
(c) Shortage of cooking pan	1	3.85
(d) Others		

The problem of drying may be solved by introducing electricity operated drying method. In countries developed in sericulture drying is done by hot air. It is carried out in chambers of special design heated by electrical device. The introduction of this method in Bangladesh is difficult as there is no electricity in most of the cocoon producing areas. Moreover, the individual rearer or reeler cannot bear the expenses of establishing electrically operated drying chamber. The Sericulture Board may take the responsibility of establishing drying chamber at village level. So long as there is no such arrangement the Sericulture Board can solve the problem of drying by purchasing cocoon immediately after harvest i.e. in green condition. But purchasing of cocoon takes long time due to the existence of a long chain of middle man between the Sericulture Board and the cocoon rearer. Sometimes purchasing delays as the Sericulture Board takes time to decide how much of cocoon it will buy. Until and unless Sericulture Board close its purchase the private reeler also cannot go for buying cocoon. Hence, the Sericulture Board has much responsibility in solving the problem of drying.

To solve the problem of boiling of cocoon in "Bangladesh - Swiss Development Project in Sericulture" suggested to introduce three pan system of cooking which is less fuel consuming and also a continuous process. This system can be easily introduced as it does not involve any higher technologies.

No reeling entrepreneur mentioned that the present technique of reeling is a problem in the way of producing quality and quantity silk yarn. It does not mean that the present technique of reeling is alright for them. It means they are quite ignorant of the improved technique of reeling which could improve their efficiency several times.

The policy of the Sericulture Board toward reeling requires reconsideration by the government. At this moment most of the cocoon produced in Bangladesh is of local variety which cannot profitably be reeled in the filature reeling saves labour which is surplus in Bangladesh. Moreover, filature reeling cannot employ skilled reeler

who always tries to reel of his own as reeling give him high remuneration. The reelers engaged in filature have training in reeling in the training institute run by the Sericulture Board. But necessary skill and quickness in reeling are attained only after a considerable practice, which the reelers engaged in filature reeling lack. The skilled and experienced reeler in the private sector sit idle most of the time for shortage of raw materials and for the restriction imposed by the Sericulture Board on reeling. It is mentioned earlier that many rearers have ghari machine and skill in reeling. But they do not undertake reeling activity due to the restriction imposed by the Sericulture Board. Taking all these into consideration the government should reformulate her policy toward reeling. It is true that in the khatghai reeling the fineness and thinness of silk yarn is affected much. But this defect can easily be over-come by introducing improved Khatghai reeling which is already in operation in India.

3.3.4 Technique Used in Weaving

Technique used in weaving of silk cloth is similar to the technique used in textile industry. As such very little attempt is made in the present study to describe the technique used in weaving silk cloth.

At the present level of industrialisation of Bangladesh, it is not surprising that handloom is used to weave most of the silk cloth produced in the country. It is already mentioned that Rajshahi and Thakurgaon silk factory together produce 30% of the total production of silk cloth. Out of this amount about 87% is woven on powerloom while the rest 13% is woven on handloom. In the present survey only two weavers are found using semi-automatic loom (see Table 3.12). They also used handloom. Not a single weaver is found using automatic loom. All weavers use handloom for weaving purpose. In handloom weaving all operations are done by hand and the loom is driven by foot. Weaving on handloom is a very slow process. It takes 20 to 30 mandays to finish a katan¹ saree and about 10 to 15 mandays to finish a plain silk saree.

¹There are different kinds of Katan Saree made either with pure silk or with a combination of pure and artificial silk in different proportion. In the present report Katan Saree graded as No. 1 is made of pure silk with thick embroidery work of silk and jory thread.

Katan saree loses its glamour to some extent if woven on automatic power driven loom. So, it is wise for katan saree to be woven on hand-loom even if industrialisation of the country develops to introduce automatic power driven loom in the private sector in large scale. Introduction of power loom in the private sector will increase several times the production of plain silk saree with print and border, silk cloth used for dresses and other silk fabric without hampering any glamour of silk. Rather it will add to fineness of the silk fabric.

TABLE 3.12

TECHNIQUE USED IN WEAVING

Types of machineries	No. of weaving enterprise using different machineries	%
1) Traditional loom	65	100
2) Semi automatic	2	3.07
3) Automatic	-	-
4) Tana dram	1	1.53
5) Jori machine	2	3.07
6) Twisting machine	-	-
7) Charka	45	69.23

Only one tana dram is found during the present survey. Tana dram is the local name of a hand operated equipment which mechanically lines up the thread in vertical axes to form the basis of the woven cloth. In its absence hand and wood is used to perform this job.

The so-called jori machine twists the imported artificial silk thread with local natural silk thread to form the jori which is used for embroidery work on the katan saree. Only two jori machines are found throughout the present survey. As such the weaver producing katan saree suffers from the shortage of jori. Sometime they are bound

to buy jori from India through smuggled channels.

Twisting machine is used to twist silk thread firmly so that thread does not get broken in the silk cloth manufacturing process. But not a single twisting machine is found in the present survey. The weavers in the private sector severely feel its absence. Most of the project proposals coming from the weaver themselves suggest to install twisting machine for them.

Charka a simple hand driven machine is used to reel silk thread in a bobbin which is used as spindle in the weaving process. This job is done absolutely by the women. In the present survey 69% of the weaving enterprise is found having charka.

From the above description it is evident that technique used in silk weaving industry in Bangladesh is mostly traditional. Increase of production of silk cloth both in terms of quantity and quality requires present technique to be improved. But improvement of the technique of weaving is greatly dependent on the improvement of the technique of reeling rearing and planting. Thus any attempt for the development of sericulture industry must start from the grass root i.e. from planting and subsequently development attempt should be made at the stages of rearing reeling and weaving.

3.3.4.1 Problems Involved in Improving the Technique of Weaving

Finance is the most important problem facing the weaving enterprise to improve the technique of weaving introduction of semi-automatic loom, jorry and twisting machine and tana dram will improve the technique substantially. But introduction of these machine requires large amount of money which the weaving enterprise cannot afford. Easy loan from the institutional source may solve this problem.

CHAPTER IV

OUTPUT, COST STRUCTURE, VALUE ADDED,
PRODUCTIVITY AND PROFITABILITY4.1 Production of Mulberry Leaves

Production of mulberry leaves is presented in Table 4.1. As it would appear from the table that production of mulberry leaves during the period 1976/77 - 1978/79 increased by 10.8%. It would also appear from the same table that this increase is mostly contributed by the planting enterprise.

TABLE 4.1

PRODUCTION OF MULBERRY LEAVES IN THE YEAR
1969-70, 1976-77, 1977-78 AND 1978-79

Years	Planting enterprise		Rearing enterprise		Reeling enterprise		Total	
	Production (in maund)	Percentage change in production (base year 1976-77)	Production (in maund)	Percentage change in production (base year 1976-77)	Production (in maund)	Percentage change in production (base year 1976-77)	Production (in maund)	Percentage change in production (base year 1976-77)
1976-77	890	-	16237	-	5705	-	22852	-
1977-78	941	5.73	16418	1.11	6125	7.36	23534	2.98
1978-79	1259	41.46	17422	7.30	6590	15.51	25321	10.80

4.1.1 Cost of Production

Three components of the cost of production are identified as follows:

- i) Cost of purchased input
- ii) Cost of self-produced input
- iii) Cost of labour

Cost of the purchased input was calculated as total amount of purchased input multiplied by the market price of the same as reported by the entrepreneur himself. Cost of the self-produced inputs was calculated on the basis of the cost incurred in producing the same. In calculating the cost of labour only the hired labour was considered. But in calculating the profitability, cost of family labour is calculated by imputing the wage rate in the sericulture sector. Cost of labour incurred in performing different stages of sericulture activity could not be calculated separately as no information was collected on this subject. It was observed during the present survey that the entrepreneur performing more than one stage of sericulture activity is unable to identify how much labour is incurred in performing particular stage of activity as the same labour performs different stages.

Cost of Mulberry Production

Cost of mulberry cultivation in the survey is constituted by the cost of manure, cost of chemical fertilizer and cost of hired labour. Cost structure of mulberry cultivation is shown in the Table 4.2 only for the planting enterprise. The same cost structure cannot be shown for rearing and reeling enterprise who also produce mulberry leaves as it is difficult to calculate separately for them the labour cost incurred

TABLE 4.2

COST OF PRODUCTION OF MULBERRY LEAVES

	Total cost	Percentage cost compo- nents to the total cost	Cost per maund	Cost per acre
Cost of manure	3054	25.60	2.74	607.03
Cost of the fertilizer	1510	12.7	1.20	265.38
Cost of labour	6964	58.4	5.53	1223.90
Others	400	3.5	-	-
Total	11928	100.0	9.47	2096.31

in planting, rearing and reeling activities. Cost of labour incurred in mulberry cultivation accounts for as large as 53.4% of the total cost. This share will be even higher if a price is imputed to the family labour who are in large number engaged in mulberry production. Cost of chemical fertilizer accounts for only 12.7% while the cost of manure accounts for about 30% of the total cost. In actual the share of manure is even higher than this figure. In many cases the respondent did not mention the cost of manure produced at home.

Cost of mulberry leaves per maund is calculated at Tk. 9.47. But this cost is different for enterprises performing different stages of sericulture activity as the amount of input used per acre is different for them. Table 4.3 shows input used per acre by enterprise type. As it would appear from the table that rearing enterprise uses the lowest amount of input per acre but produces the highest amount of mulberry leaves per acre. It may be due to the fact that the rearing enterprise uses more labour per acre than the planting and reeling enterprise use. But it cannot be confirmed due to the unavailability of labour per acre employed by the rearing, reeling and planting enterprise for mulberry production.

TABLE 4.3

INPUT USED PER ACRE FOR ACRE FOR MULBERRY PRODUCTION
BY ENTERPRISE TYPE

Enterprise type	Manure	Fertilizer	Total	Production of mulberry leaves per acre (maund)	Input per acre (in Taka)
Planting enterprise	3454	1510	4864	221.26	854.83
Rearing enterprise	35198	34872	37070	264.57	562.95
Reeling enterprise	12730	7075	19805	210.67	633.15

4.1.2 Plan for Increasing the Production of Mulberry Leaves in the Coming Year

The Table 4.4 shows the percentage of sericulture enterprise having ambitious plan for increasing the production of mulberry leaves in the coming years. It could be seen from the table that among all types of sericulture entrepreneurs planting entrepreneurs in largest number have ambitious plan for increasing mulberry production. Most of them like to increase production by using fertilizer and irrigation whereas most of the reeling enterprise having plan for increasing mulberry production like to increase production by bringing more land under mulberry production.

TABLE 4.4

PERCENTAGE OF SERICULTURE ENTERPRISE HAVING AMBITIOUS PLAN FOR INCREASING THE PRODUCTION OF MULBERRY LEAVES IN THE COMING YEARS

Enterprise type	(Figures in percentage of enterprise)				
	Possible means for increasing mulberry production				
	Percentage of enterprise having plan	Cultivating more land	Using more fertilizer	Using irrigation	Others
Planting enterprise	78.94	20.31	52.63	52.63	5.26
Rearing enterprise	55.63	26.05	37.32	25.35	1.40
Reeling enterprise	42.30	38.46	15.38	7.69	-
Total	56.14	27.80	35.82	25.26	1.60

The Govt. of Bangladesh also has ambitious plan for increasing mulberry production. It likes to increase mulberry acreage as the pre-requisit for increasing mulberry production. A crash programme was undertaken in 1978 by the Sericulture Board to increase mulberry acreage by 2180 acres by the end of 1981. Another 2250 acres will be increased by 1981 with the implementation of "Swiss - Bangladesh Bilateral Project"

initiated by the Swiss-Development Corporation Programme in conjunction with the Govt. of Bangladesh. But very little of this plan target is achieved so far as very little attempt has been made to supply fertilizer and irrigation facilities.

4.2 Production of Cocoon

Table 4.5 shows production of cocoon in the years 1976-77, 1977-78 and 1978-79. As is evidenced from the table that cocoon production of rearing enterprise increasing continuously whereas that of reeling enterprise decreased a little in the year 1978-79.

TABLE 4.5

PRODUCTION OF COCOON (IN MAUNDS) IN THE YEARS

Y e a r	Production of cocoon (Qty. in maund)	Production per enterprise	Production of cocoon (Qty. in maund)	Production per enterprise
1976-77	850	5.99	265.00	10.12
1977-78	935.13	6.59	300.50	11.59
1978-79	1083.50	7.63	299.50	11.51

The table also shows that the production per enterprise is more for the reeling enterprise than that for the rearing enterprise. It is seen earlier that reeling enterprise has more land under mulberry cultivation and more family labour than those of the rearing enterprise and hence, it is natural that cocoon production which depends mainly on the availability of mulberry leaf and labour, will be more for reeling enterprise. Moreover, it is also seen earlier that the technique used in rearing by the reeling enterprise is little different from the technique used by the rearing enterprise. Reeling enterprise rear more HYV of cocoon which gives more yield.

4.2.1 Cost of Raising Cocoon

The table 4.6 shows volume of cost incurred by the rearing enterprise in performing planting and rearing activity. Cost incurred in planting is considered as the cost of self produced input in rearing (as the final product of the planting activity is used as input in raising activity).

As is envisaged from the table 4.6 that more than 37% of the total cost incurred by the rearing enterprise accounts for mulberry leaf. To this figure cost of producing mulberry leaf at home also will be added together to find out the total cost of mulberry leaf incurred in cocoon production. Total cost of producing mulberry leaf at home includes cost of manure and cost of fertilizer which together accounts for about 9% of total cost of cocoon production. The cost of

TABLE 4.6
COST OF PRODUCING COCOON

Cost of components	Cost (Taka)	Cost component as per- centage of total cost
Cost of manure	22,198	5.28
Cost of fertilizer	14,872	3.57
Cost of mulberry leaves*	154,803	37.16
Cost of laying	15,223	3.65
Chandarki rent	1,300	0.31
Cost of replanting rearing tools	19,415	4.66
Cost of repair and others	22,115	5.31
Wages and salaries paid to hired labours	166,221	40.00
Others	700	.06
Total	416,847	100.00

*Cost of mulberry leaves = (Purchase - Sale) of mulberry leaves.

labour (40.06%) is made up of the sum incurred in hiring labour both for rearing and planting purpose. As it would appear from Table 4.6 that mulberry leaf and labour together account for more than 86% of the total cost incurred in producing cocoon. This share will be even higher if cocoon is reared entirely on mulberry leaf purchased from the market. Because there is a big gap between the cost price and selling price of mulberry leaf per maund. Cost price of mulberry leaves is calculated at Tk. 9.5 only whereas the selling price reported by the interviewee varies between Tk. 30 to Tk. 50. The rearing enterprises buy only 30% of the total leaf consumed by the silk worm. The rest he produces himself. The reeling enterprise buys only 10% of the total mulberry leaf required for cocoon rearing.

Other components of the total cost of cocoon rearing are the cost of laying, cost of renting chandraki, cost of replacing chandraki, cost of repair and maintenance, and cost of insecticide. The cocoon rearer does not incur the cost of insecticides as it is supplied by the Sericulture Board free of cost. Layings are also supplied by the Sericulture Board at subsidised price and as such cost of laying accounts for only about 4% of the total cost.

Cost of cocoon per maund is calculated at Tk. 384.72 for all varieties of cocoon. But the rearing cost of all varieties of silk worm is not the same. The price of laying of different varieties are different. Volume of mulberry leaf consumed by different varieties is different. Time taken to be mature ^{at} by different varieties is different and here volume of labour required for rearing different varieties is different. Therefore, cost per maund of cocoon is not the same for all varieties of silk worm. Cost of rearing local variety is the lowest and highest cost incurred in rearing foreign variety. In this respect no numerical fact is possible to give as the cost of cocoon obtained from the present survey is difficult to divide for different varieties of cocoon. Because the question was posed to the entrepreneur to identify separately the cost of rearing different varieties of silk worm.

4.2.2 Plan for Increasing the Production of Cocoon in the Coming Years:

Table 4.7 shows percentage of sericulture enterprise having ambitious plan to increase cocoon production in the coming years. The table shows that 58% of the enterprise rearing cocoon have plan to increase cocoon production. Among them rearing enterprises is the largest in number to have plan. Most of them like to increase cocoon production by increasing mulberry production whereas most of the reeling enterprise having plan like to increase cocoon production by rearing improved variety laying. Here it is evident that the reeling enterprise is more eger to adopt improved technique of rearing than the rearing enterprise.

TABLE 4.7

PERCENTAGE OF SERICULTURE ENTERPRISE HAVING AMBITIOUS PLAN FOR INCREASING THE PRODUCTION OF COCOON IN THE COMING YEAR

Enterprise type	Possible means for increasing production of cocoon						Others
	Percentage of enterprise having plan	Cultivating more mulberry land	Purchasing ² more mulberry leaves	Rearing improved variety	Expanding rearing room	Increasing rearing tools (Dala or Chandraki shelf)	
Rearer	60	43	5	13	18	4	21
Reeler	46	23	-	37	19	-	13
Total	58	38	4	15	18	3.5	34

The Govt. of Bangladesh has an ambitious plan of increasing cocoon production from 17 lack pounds to 60 lack pounds during the Second Five Year Plan period (1980/81 - 1984/85). This target will be achieved through the implementation of different Govt. sponsored schemes namely Development of Sericulture nurseries, Swiss-Bangladesh Bilateral Project, Crash Programme for Extension of Sericulture, establishment of two New Sericulture Nurseries - One at Khulna and the other at Jessore, Training and Subsidy for Seed Growers in Private Sector, subsidy for rearing, subsidy on microscopes etc. There is enough reason to express doubt over the achievement of the target of cocoon production through the implementation of these schemes. It is now almost three years, the Crash Programme and the Swiss - Bangladesh Bilateral Project were started. But very little was achieved in terms of the increase in the cocoon production.

4.3 Production of Silk Yarn

More than 50% of the total silk yarn production of the country is produced in cottage establishments of individualistic character. The rest of 50% of silk yarn production is produced in the silk factory of Rajshahi. It is worth mentioning here that production of silk yarn per 1 lbs. of cocoon is more in cottage establishments than in the filature establishment. It is mainly due to the fact that the cocoon now produced cannot be reeled profitably in the filature. Most of the cocoon as is mentioned earlier is produced from the local variety of multivoltine race which can profitably be reeled only in the cottage establishments. But the policy of the Government of Bangladesh is to encourage filature reeling instead of Khatghai (local reeling machine) reeling with an excuse that filature reeling produces silk yarn of better quality than Khatgahi reeling. But the policy makers is not aware of the fact that most of the silk content of the cocoon now produced in Bangladesh is wasted if reeled in filature establishment.

The Sericulture Board is supposed to sell the silk waste of the Rajshahi silk factory to the local reeler who can profitably use this waste to produce matka - a variety of silk fibre. But in practice very few local reeler can manage to get waste from the Rajshahi silk

factory. (It is found in the present survey that only 12% of the total reeling enterprise produce silk yarn from waste). Sericulture Board exports most of the waste.

In the present survey production of silk yarn per enterprise as shown in the following table is calculated at about 156 lbs. About 3 pounds of this amount is produced from waste. To produce this amount of 156 lbs. of silk yarn each enterprise uses 2106 lbs. of cocoon most of which they have to buy and the rest is self produced.

TABLE 4.8

PRODUCTION OF SILK YARN IN THE YEAR 1978-1979

	Total production (in lb.)	Value of production (in Tk.)	Production per enterprise (in lb.)	Value per enterprise
Reeling enterprise	4049	830,950	156	31960

4.3.1 Cost of Producing Silk Yarn

Cost structure of reeling enterprise is shown in the Table 4.9. Cost of reeling 1 lb of silk yarn starting from planting is calculated at Tk. 150. More than 24% of the total cost accounts for hired labour. The cost of mulberry leaves produced and the cost of mulberry leaves bought excluding the income earned from selling the mulberry leaves together account for about 10% of the total cost. Cost of cocoon accounts for the largest share of the total cost. About 55% of the total cost incurred for cocoon purchase excluding the amount earned from cocoons sold. Cost of fuel also is an important component of the cost of reeling. More than 9% of the total cost is incurred for fuel. Roots of tree and thick wood are mainly used as fuel for boiling cocoon. The supply of this kind of fuel is very short as such the price is high.

TABLE 4.9

COST STRUCTURE OF THE REELING ENTERPRISE

Cost components	Cost (Taka)	% distribution
Cost of manure	12,730	2.09
Cost of fertilizer	7,075	1.16
Cost of mulberry leaves*	38,120	6.30
Cost of layings	6,073	1.00
Rent of chandraki	450	0.70
Cost of replacing rearing tools	4,300	0.70
Cost of cocoon**	33±,500	54.51
Cost of fuels	55,300	9.10
Cost of repair and others	5,093	0.84
Wages aid to hired labours	146,386	24.07
Others	1,085	0.10
Total	608,112	100.00

$$\text{Cost per 1 lb. of silk yarn} = \frac{608,112}{4049} = \text{Tk. 150/-}$$

* Cost of mulberry leaves*=(Total purchase - Total sale) of mulberry leaves.

** Cost of cocoon = (Total purchase - Total sale) of cocoon.

4.3.2 Plan for Increasing the Production of Silk Yarn

The reelers have high ambition to increase their production as the production of silk yarn gives them high remuneration. In the present survey it is found that about 62% of reelers entrepreneur like to increase their production of silk yarn if every facilities are available. They like to increase about 65% of their total production (See the Table 4.10).

TABLE 4.10

INCREASE OF PRODUCTION OF SILK YARN SUBJECT TO AVAILABILITY OF ALL FACILITIES

Percentage of reeling enter- prise willing to increase production	Total quality to be increased (in lb.)	Quality to be increased per enterprise (in lb.)	Increase of production as percentage of the present level of production
62	2593	99	65.5

4.4 Production of Silk Cloth

The Rajshahi silk factory and the RDRS silk factory at Thakurgaon together produce about 30% of the total production of silk fabric in the country while the weavers of Shibganj and Mirpur together produce the rest 70% of the total production. Among them the weavers of Mirpur contribute the largest share (about 37%) to the production. They, mainly, produce the variety of Katan Saree of Banarasi design as they belonged to Banaras of India before the partition of 1947. They also produce organja katan and cotton saree. The weavers of Shibganj produce pure silk saree with print, gorod saree with borders of different colours (graded as Gorod - II in the present survey) and gorod saree with stripe and border of jerry (graded as Gorod-I). The Shibganj weavers produce the print saree in very small number while the Rajshahi silk factory produces this type of saree in large number.

The total production of silk cloth obtained in the present survey is shown in the Table 4.11. The share of different varieties of silk cloth is also shown in the same table. The variety of Gorod-II accounts for the largest share of the total production of silk cloth. It accounts for about 39% of the total production. The variety of Gorod-I accounts for the 2nd largest share i.e. more than 25% of the total production. The variety of Katan I accounts for about 12% while the variety of Katan II accounts for about 10% of the total production.

TABLE 4.11

TOTAL PRODUCTION OF SILK CLOTH AND THE SHARE OF
DIFFERENT VARIETIES OF SILK CLOTH IN THE TOTAL
PRODUCTION

Varieties	Production (in pieces)	Share of different varieties (as percent- age of total production)	Production in terms value	Share of diffe- rent varieties (as percentage of the total value of production)
Katan - I	1758	11.66	23,73,300	30.02
Katan - II	1476	9.79	9,59,400	12.14
Gorod - I	3825	25.38	15,87,375	20.08
Gorod - II	5842	38.76	23,36,800	29.56
Organja Banarasi	1428	9.47	4,99,800	6.32
Cotton Banarasi	744	4.94	1,48,800	1.88
Total	15073	100.00	79,05,475	100.00

In making Katan saree of grade I pure silk is used while in making Katan saree of grade II both nylon and pure silk is used. In case of Katan II nylon thread is used in lining up the vertical axes of the saree. In both cases jorri is used for embroidery purposes. The variety of organja katan and cotton banarasi saree does not consume any pure silk. Teh weavers of Mirpur make these varieties of organja katan and cotton banarasi mainly due to high demand for these kinds

of saree and also due to shortage of pure silk yarn. The problem of the shortage of silk yarn is badly faced by the weavers of Mirpur.

The share of different varieties of silk cloth in the total production will be different if value instead of the number of pieces is taken into consideration. Because katan saree demands several times higher price than gorod saree. The price per piece of katan I ranges between Tk. 1300 to Tk. 1400 while the price per piece of Gorod II ranges between Tk. 350 to Tk. 400 only. The column 4 of the Table 4.11 shows share of different varieties of silk cloth in terms of value. As it would appear from the table that the share of katan variety to the total production increases several times while opposite is the case with the varieties of Gorod, organja banarasi and cotton banarasi when value instead of the number of pieces is taken into consideration.

The weavers earn maximum profit from the variety of Katan I. The price of katan I ranges between Tk. 1300 to 1400 while the cost of the same ranges between Tk. 1050 to Tk. 1150 (as reported by the weaver). Thus there is a profit of Tk. 250. But in case of gorod saree maximum profit ranges between Tk. 100^{to Tk. 150}. Here it seems that the income of the weaver weaving katan saree will be higher than the weavers weaving gorod saree. In the present survey the income per weaving enterprise of Shibganj who produces no katan saree is estimated at around Tk. 10,000 per month while the same for the weaving enterprise of Mirpur is estimated at around Tk. 30,000. Here, it must be mentioned that a large part of yarn used by the weavers of Mirpur is nylon and artificial silk yarn while the weavers of Shibganj use only pure silk yarn costing several times higher than nylon and artificial silk.

4.4.1 Cost of Producing Silk Cloth

The cost structure of the weaving enterprise has been presented in Table 4.12. It can be seen from the table that two major components of the cost of producing silk cloth are cost of silk yarn and largest share of the total cost. Cost of labour accounts for cost of labour which account about 65% and 21% respectively. Other components of the total cost are the cost of nylon, cost of jori and artificial silk,

cost of soap, soda and dyeing materials which account very negligible portion of total cost.

TABLE 4.12

COST STRUCTURE OF THE WEAVING ENTERPRISE

Cost of component	Cost	% Distribution
Silk yarn	37,60,450	64.87 64.87
Nylon & cotton thread	1,56,083	2.69
Jori and art sil	4,38,236	7.56
Dyeing materials	1,93,369	3.34
Soap and soda	28,027	0.48
Wages paid to hired labour	11,98,188	20.67
Others	22,616.	0.39
Total	57,96,969	100.00

4.5 Gross Value of Output

Gross value of output has been calculated in the present study as the amount of output produced in a year by types of enterprise multiplied by the price of product as reported by the respondent. Table 4.13 presents the gross value of output by enterprise types. As is evidenced by the table that the gross value of output per enterprise is increasing significantly as more and more stages of sericulture activity are concentrated into one enterprise. Reeling enterprise concentrating three stages of activity has several times higher gross value of output than the rearing enterprise which performs two stages of activity. Rearing enterprise, on the other hand, has several times higher gross value of output than the planting enterprise performing only one stage of activity. Almost same trend is shown by the gross value of output per man-day. But it is not only because of the

TABLE 4.13

GROSS VALUE OF OUTPUT BY TYPES OF ENTERPRISE

Types of Enterprise	Gross value of output (in Tk.)	Gross value of output per enterprise	Gross value of output per manday
Planting enterprise	51235	2697	4.73
Rearing enterprise	755785	5323	5.66
Reeling enterprise	899770	34614	17.66
Weaving enterprise	7776074	119632	37.37
All	9,482,864	37,630	23.14

concentration of stages of activity but also because of the difference of technology used by different types of enterprise. Weaving enterprise performing only one activity has the highest amount of gross value of output. It is because of the fact that weaving is a round the year job while planting, rearing and reeling are seasonal activities. It is also because of the fact that weaving is the most capital intensive activity among the sericulture activities.

4.5.1 Gross Value of Output and its Component

The gross value of output is broken down into cost of raw materials, charges on hired labour and the income of the non wage labour. Depreciation cost is also an elements of the gross value. But in the present survey no information is available on depreciation of machines and tools. Here, certain amount of the income of non wage labour is attributable to depreciation cost. But this will not be a big amount to disturb the income of the non wage earner. Because, accept some hand and foot operated tools actually no machine is used in sericulture activity./

Table 4.14 presents the gross value of output and its components. As it would appear from the table that raw materials shares maximum in the gross value of output of the weaving enterprise while this component shares minimum in the gross value of output of the planting enterprise. But quite opposite fact is revealed when the share of the family income is considered. This is mainly because of the technology differences in different stages of sericulture activities.

4.6 Value Added

The value added has been calculated as gross value of sericulture output minus cost of raw materials. Table 4.15 shows value added obtained by different types of sericulture enterprise at the end of different stages of sericulture activity. It would appear from the table that the value added per enterprise is increasing as more and more stages of activity is concentrated. It is natural that the value added of the rearing enterprise performing two stages of activity, will be higher than that of the planting enterprise performing only one stage of activity,

In the same way reeling enterprise performing three stages of activity has higher value added than the rearing enterprise. But the difference of value added per enterprise between two stages of activity (See the last column of Table 4.15) exposes the fact that the concentration of planting, rearing and reeling activity increases the value added several times higher than the concentration of planting and rearing activity. The difference of value added per enterprise between the planting and rearing enterprise is only Tk. 1127 while it is as big as Tk. 13286 between the rearing and reeling enterprise. From this fact it may be concluded that the reeling activity adds much more value than the rearing activity.

GROSS VALUE OF OUTPUT AND ITS COMPONENTS

Enterprise Type	Gross value of output (in Tk.)	c o m p o n e n t s							
		Cost of raw materials (in Tk.)	Raw materials as % of total gross value of output	Wages salaries paid to hired labour (in Tk.)	Wages as % of total gross value of output	Income of the family or non-wage labour (in Tk.)	Income of the family as % of total gross value of output	Other cost	Other cost as of the total gross value
Planting enterprise	51,235	4,964	9.68	6,964	13.59	38,907	75.92	400	0.78
Rearing enterprise	755,785	249,926	33.07	166,920	22.09	338,238	44.71	700	0.09
Reeling enterprise	899,770	461,726	51.32	146,386	16.27	290,573	32.29	1,085	0.12
Weaving enterprise	7,776,074	4,599,215	59.14	1,199,188	15.42	1,955,055	25.14	22,616	0.29
All	9,482,964	5,315,831	56.06	1,519,588	16.02	2,622,773	27.66	24,801	0.26

TABLE 4.15

VALUE ADDED BY ENTERPRISE TYPES

Enterprise Types	Total value of production (total output price)	Total cost of input	Total value added total value of prod. cost of input	Value added per enterprises	Value added per man-day	Difference of value added per enterprise between two stages of activities
Planting enterprise	51,235	4,964	46,271	2,435	4.27	-
Rearing enterprise	755,785	249,926	505,859	3,562	3.61	1,127
Reeling enterprise	899,770	461,726	438,044	16,348	8.59	13,286
Weaving enterprise	7,776,074	4,599,215	3,176,859	48,375	15.27	32,027

4.7 Productivity4.7.1 Labour Productivity

Output labour ratio defines the labour productivity. Output labour ratio has been calculated as the total output produced in a year divided by the total number of labour employed in the same year to produce the output. Total output is defined as the value added (as calculated in the previous section) by the enterprise during a year. Labour productivity can be seen from Table 4.16 for various types of sericulture enterprises. Both the value added per worker and the value added per labour hours measures the labour productivity. But value added per labour hour will reflect more accurately the actual picture of the sericulture industry as a large portion of the work force in the industry is employed on a part-time basis.

TABLE 4.16

OUTPUT LABOUR RATIO

Enterprise type	Value added per worker per year	Value added per labour hour
Planting enterprise	907	0.52
Rearing enterprise	566	0.44
Reeling enterprise	1,137	1.11
Weaving enterprise	4,551	1.90
All	21,502	1.08

As it would appear from Table 4.16 that value added per labour hour for planting enterprise performing only one stage of activity is higher than that for rearing enterprise performing two stages of activity. It may partly be due to the fact that the rearing enterprise does not get proper value for its product of cocoon due to the Sericulture Board's cocoon marketing policy¹. The rearer could have earned more if he could sell his product at a time and a place of his choice. It may also be due to the fact that rearing enterprise use more labour intensive method in rearing activity than the planting enterprise and as such, value added per man hour become lesser for rearing enterprise than that for planting enterprise.

Value added per labour hour for reeling enterprise is several times higher than that for rearing enterprise. This is partly due to the high profitability of the final product the reeling enterprise produces and partly due to the technological variation in production process. Integration of reeling activity together with planting and rearing expands the size of firm and change the technology which results in high

^{1/} Cocoon marketing policy of the Sericulture Board has been described in detail while discussing sericulture marketing in Chapter VII in the present report.

productivity. From this fact it may be concluded in the same way as has been done earlier that the concentration of planting rearing and reeling activity in one enterprise is much more remunerative than the concentration of planting and rearing activity. Thus, the concentration of three stages of sericulture activity in one enterprise is a necessary condition to make the sericulture activity a profitable business.

4.7.2 Capital Employed per Worker

Sericulture activity is highly labour intensive rather than capital intensive one. Capital requirement per worker is very small. As Table 4.17 shows that the average capital requirement per worker per year is only Tk. 1,238. This amount varies widely among different types of sericulture activity. It would appear from table 4.17 that capital requirement per worker is increasing steadily as one moves in the table from planting to weaving activity. This variation of capital intensity may be explained by the simple fact that more capital intensive production method is used as the activity becomes more manufactural in nature.

TABLE 4.17

CAPITAL-LABOUR RATIO

Enterprise type	Total capital* invested during a year	Number of worker employed during a year	Capital labour ratio (1-2)
Planting enterprise	7700**	51	151
Rearing enterprise	394037	904	436
Reeling enterprise	274037	285	962
Weaving enterprise	2003713	698	2871
Total	2,679,489	1,938	1,383

*Total capital = total fixed capital + total working capital invested during a year

**Total capital of planting enterprise does not include fixed capital as valuation of land and other fixed assets of the planting enterprise is a difficult task.

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4.7.3 Capital Productivity

Output capital ratios for different types of sericulture enterprise are shown in the following table. As it is appeared in the table that on an average one unit of capital employed in the sericulture industry adds an income of 1.33 units. But this figure varies among different types of sericulture enterprises. Like labour productivity capital productivity is also lowest for rearing enterprise and highest for weaving enterprise. Reeling enterprise has higher capital productivity than rearing enterprise. Same reason explaining the labour productivity variation is applicable here and thus same conclusion follows that integration of planting rearing and reeling activity is a dynamic factor to raise the productivity of both labour and capital.

TABLE 4.18
OUTPUT CAPITAL RATIOS

Types of enterprise.	Total caital	Total value added	Value/ added/ Capital
Planting enterprise	**	**	
Rearing enterprise	394,039	505,859	1.35
Reeling enterpirse	274,037	438,044	1.60
Weaving enterprise	2,003,713	3,176,859	1.65
Total	2,679,489	3,570,938	1.33

**Output capital ratio for planting enterprise has not been calcuatlred as the valuation of fixed assets of the planting enterprise has not been done.

4.8 Profitability

Value added or productivity discussed in the previous section is not a proper index of profitability. Rate of profit should be taken into consideration to ascertain the profitability of different stages of sericulture activity.

Profits have been obtained by deducting the imputed value of family labour from the family income of the enterprise. Wage rate in the sericulture sector has been imputed to find out the cost of family labour. Table 4.19 shows the profitability rate of sericulture enterprise performing different stages of sericulture activity.

TABLE 4.19

PROFITABILITY BY ENTERPRISE TYPES

Enterprise type	Family income per enterprise	Imputed value of family worker per enterprise	Profit per enterprise	Profit per unit of capital (%)
Planting enterprise	2,048	3,135	- 1,087	**
Rearing enterprise	2,382	4,824	- 2,442	- 70.68
Reeling enterprise	11,176	9,966	1,210	7.34
Weaving enterprise	30,078	14,009	16,069	157.14

As is evidenced from the table that profit is negative for planting and rearing enterprise. It means that planting and rearing enterprises accept a lower rate of return on their family labour compared to the wage rate paid to the hired labour employed in these enterprises. Profit become positive only when reeling activity is undertaken together with planting and rearing activity. Table 4.19 shows that the rate of profit per unit of capital employed by the reeling enterprise is 7.34%. It means that the reeling activity is so profitable that the reeling enterprise could earn profit even after compensating the loss on capital employed in planting and rearing activity.

4.8 Integration

From the above discussion it is confirmed that integration of planting, rearing and reeling activity in one production unit is a necessary factor to make the sericulture industry a profitable business. Disintegration among these three stages of activity creates various maladjustments disturbing the production process. For example, one cannot plan the volume of production of the stage of silk worm rearing without estimating the availability of mulberry leaves which are necessary to feed the silk worms. It happens in many cases that the rearers take decisions about the production of cocoon without taking into consideration the availability of mulberry leaves. This often results in the fact that when the cocoon worms are half-fed or three - fourths - fed there is a shortage of leaves. Sometimes the quality of leaves rather than the shortage of leaves is the problem because the protein contents of mulberry leaves from different soils are different. Cocoon worms are very much sensitive to the quality of mulberry leaves. When there are different qualities of mulberry leaves they stop eating and die. The rearer must have full control on the quality and the quantity of mulberry leaves available so that a steady supply of mulberry leaves of the desired quality can be maintained all through at requisite intervals. This is possible only when there is a well-knit integration between the stage of planting activity and the stage of rearing activity.

Some maladjustments also occur between the stages of rearing and reeling activities due to the absence of well-knit integration between these two stages. It happens in many cases that the rearers cannot sell their produce of cocoon at the appropriate time and place. The result is that the quality of product deteriorates as the cocoon worm inside the cocoon begins to undergo natural decomposition as time passes. Product is also damaged by rats and insects as the rearers sometimes have to wait two or three months after rearing to sell their product. The lack of integration between the stages of rearing and reeling activities adversely affect the reelers also, since they are not ensured of adequate and timely supplies of raw materials. It has already been discussed in the previous chapter how disintegration between rearing

and reeling activity affects the processes of reeling. From all these facts, naturally, a recommendation follows that planting rearing and reeling activities should be integrated together as a necessary condition for development of sericulture industry.

Integration may be attained by concentrating all these three stages of sericulture activities into one unit of sericulture enterprise. While arguing for integration, the question of specialisation has to be dealt with. Specialisation is dependent on the level of economic development. Our economy is at such a level at present that specialisation will result in more disadvantage than benefits.

In our view, at this stage of development of our economy in general and, specifically of the development of the sericulture industry, it will be beneficial to concentrate the three stages of sericulture activity planting, rearing and reeling - into one unit of sericulture enterprise. This concentration should continue so long as there does not develop an efficient method of coordination of the sericulture activities performed by the individual units of sericulture enterprise in the vertical sequence. In addition, at this moment some sort of loose integration should be worked out between the three stages mentioned and the final stage of weaving.

The product received at the end of the stage of reeling can be stored and waiting for it to be marketed may not be problematic. Waiting for market does not cause any quality or quantity damage to the final product of the reeling activity. Moreover,, the weaving activity employs labour throughout the year and as such it releases very little labour for the activities of planting, rearing and reeling. So, it is rather impossible for a family enterprise to undertake together the weaving activity and the planting, rearing and reeling activities. At the present level of development of the economy of Bangladesh where sericulture enterprises are mainly family enterprises, it is beneficial to allow individual units of enterprise to specialise in the weaving activity instead of integrating this activity with the other three stages. But there must be well-organised coordination between the stages of reeling

and weaving. Otherwise both the reeler and the weaver would suffer because of the imperfection of the market.

The family enterprises can efficiently combine together the activities of planting, rearing and reeling into one unit since all these activities take place in successive sequence. Rearing activity takes place when there is proper sprooting of mulberry leaves and reeling activity takes place only when the process of rearing is finished. Thus, there arises no conflict of labour engaged in the different stages. The same labourer can plant mulberry, rear cocoon and reel silk yarn.

In integrating the sericulture activity first attempt should be to remove the reasons as mentioned by the entrepreneur during the present survey for not undertaking different stages of sericulture activity. Reasons are listed in Table 4.20. Table 4.20 shows that lack of technical knowledge and cocoon marketing policy of the Sericulture Board are two main reasons mentioned by the planting entrepreneur for not undertaking the rearing activity. Lack of capital is also an important reason for not undertaking rearing activity. Most important reason for not undertaking the reeling activity are Sericulture Board's restriction¹ on Khatghai reeling.]

Filature reeling rather khatgahi reeling is encouraged by the Sericulture Board and the Sericulture Board undertakes various policy measures to restrict khatgahi reeling. The Sericulture Board compulsorily buys the major portion of cocoons produced leaving very little for khatgahi reeling. Khatgahi reelers are eligible to reel only after the Sericulture Board buys cocoons. It was mentioned before that the Sericulture Board takes a long time to buy cocoons after the harvest. So, cocoons left with the cocoon rearer after the purchase by the Sericulture Board either undergo natural decomposition or become damaged by rats and insects. If the reelers were eligible to reel immediately after the harvest, they could have earned even more from whatever cocoons

¹/ Sericulture Board's restriction of Khatghai reelign is described in Chapter VII while discussing marketing.

TABLE 4.20

PERCENTAGE OF SERICULTURE ENTREPRENEUR MENTIONING DIFFERENT REASONS
FOR NON UNDERTAKING DIFFERENT STAGES OF SERICULTURE ACTIVITY

Reasons	a c t i v i t i e s			
	Planting	Rearing	Reeling	Weaving
Lack of land	40.70	-	-	9.15
Lack of manpower	50.63	28.98	8.77	57.32
Lack of technical knowledge	53.13	53.06	28.49	90.24
Lack of capital	-	44.90	69.77	50.19
Lack of rearing facilities	-	-	-	-
Management problem	-	-	35.47	20.18
Sericulture Board's Policy of cocoon marketing	-	52.45	-	-
Sericulture Board's restriction on "Khatghai reeling	-	-	90.70	-

are left with them after the purchase by the Sericulture Board. Due to the Sericulture Board's policy the reelers resort to various malpractices to reel yarn. In most cases they reel during the night time to avoid the attention of the Sericulture Board. They buy cocoons in the black market. They hide good quality cocoons from the Sericulture Board. Because of all these reasons the rearing enterprise are not enthusiastic enough to undertake reeling activity. It is observed in the present survey that about 22% of rearing enterprise have khatghai. But they keep the "khatghai" idle mainly due to the reeling policy of Sericulture Board.

It is thus, evident that some modification of the Sericulture Board's policy is urgently needed for the development of the Sericulture industry. The Sericulture Board's policy can work in the extension areas where there is no market for cocoons due to the lack of skilled reelers. But in the areas where there are centuries old tradition of sericulture activities and an established market for cocoons as well

as thousands of skilled reelers the Sericulture Board's policy causes distress rather than improvement. It may be beneficial if the Sericulture Board undertakes khatghai reeling rather than filature reeling since there is no shortage of skilled manpower for khatghai reeling. Moreover, khatghai reeling produces more silk yarn than filature reeling from the same amount of cocoons. Therefore, a suggestion is made in this study that at the present level of sericulture development in Bangladesh the Sericulture Board should not disturb the activity of reeling. Marketing of cocoon also should not be interfered with by the Sericulture Board. In this respect the Sericulture Board may offer to the rearer an option of selling cocoons at a fair price rather than buying cocoons on a compulsory basis.

CHAPTER V

EMPLOYMENT GENERATION IN SERICULTURE INDUSTRY

5.1 Size of Employment

Sericulture activities are highly labour intensive process. The average size of employment in sericulture industry has been found to be about 7.7 whereas the average size of employment in all rural industries surveyed in the phase I of the rural industries study project is found to be 3.8 (RISP 1979).

Table 5.1 shows the number of workers per sericulture enterprise. As the table shows that among the sericulture enterprises the reeling enterprise employs the highest number of worker per enterprise while the planting enterprise employs the lowest number of worker per enterprise. Weaving enterprise employs highest number of worker per enterprise if it is carried on with family member together with hired labour instead of only with family member. Table 5.2 is that all types of sericulture enterprise running on with family member together with hired labour employ more worker per enterprise than the enterprise running exclusively with family worker. This fact may be explained as that the sericulture enterprise employs hired labour not to compensate the shortage of family worker but to expand business and thereby to earn more profit.

TABLE 5.1

Type of enterprise	Types of worker			
	Male	Female	Child	Total
Planting enterprise	2.21	0.31	0.16	2.68
Rearing enterprise	3.08	2.61	0.70	6.37
Reeling enterprise	6.00	4.40	0.56	10.96
Weaving enterprise	5.20	3.22	2.18	10.74
Total	3.88	2.76	1.05	7.68

TABLE 5.2

Types of enterprise	Worker per enterprise running exclusively with family member	Worker per enterprise running with family member together with hired labour
Planting enterprise	2.36	2.88
Rearing enterprise	4.69	7.14
Reeling enterprise	7.00	11.20
Weaving enterprise	5.63	11.46
Total	4.49	8.83

5.2 Scope of Providing Employment to the Family Member

Sericulture is a family based activity as it employs mostly family labour. In the present survey more than 55% of the total workers employed in sericulture industry is found to be family members. This percentage varies widely when the participation of family member in different types of sericulture activity is taken into consideration. It would appear from Table 5.3 which shows the share of family and hired workers in the total employment, that the proportion of family labour engaged in planting, rearing, reeling and weaving enterprise are 72.55%, 72.35%, 51.93% and 43.98% respectively. It is noteworthy that the proportion of family labour becomes lesser as one moves from planting enterprise to weaving enterprise. It is because of the fact that as the enterprise become bigger in size concentrating more stages of sericulture activity more hired labour is employed. It is also because of the fact that as the activity becomes more manufactural in nature more hired labour is employed and it has already been described earlier that the activities of planting and rearing are agricultural in nature while the activities of reeling and weaving are manufactured in nature.

TABLE 4.3

The
SHARE OF FAMILY AND HIRED WORKERS IN TOTAL NUMBER OF WORKER
EMPLOYED BY THE SERICULTURE INDUSTRY DURING 1978-79

Type of enterprise	Number of			% of		
	Family worker	Hired worker	Total	Family worker	Hired worker	Total
Planting enterprise	37	14	51	72.55	22.45	100.00
Rearing enterprise	654	250	904	72.35	22.65	100.00
Reeling enterprise	148	137	285	51.93	48.07	100.00
Weaving enterprise	307	391	698	43.98	56.02	100.00
Total	1146	792	1938	58.90	41.10	100.00

Table 5.4 shows the share of family and hired labour in the total number of day employed by types of sericulture enterprise during the year 1978-79. It would be found from the table that the share of family worker in the total employment will be higher if employment in terms of day instead of employment in terms of the number of worker is taken into consideration. It is because of the fact that the family labour works more day per year than the hired worker. As it would appear from Table 5.4 that the share of family labour in terms of day increases several times in all enterprises. But if employment in terms of hour is taken into consideration then it will interestingly be found that the share of family worker decreases a bit (see Table 5.5). It is because of the fact that the family labour works fewer hours per day than the hired labour who is bound to work certain period of time a day if he wants to get the full wage. In many cases the hired labours are employed on piece - rate basis which compels them to work longer period to finish as many pieces as contracted.

TABLE 5.4

SHARE OF FAMILY AND HIRED LABOUR IN TOTAL NUMBER OF DAY EMPLOYED
BY THE SERICULTURE INDUSTRY DURING THE YEAR 1978-79

Types of enterprise	Number of day worked by			Share of worker as percentage of total		
	Family worker	Hired worker	Total	Family worker	Hired worker	Total
Planting enterprise	9,735	1,098	10,833	89.79	10.21	100.00
Rearing enterprise	119,081	20,890	139,971	85.08	14.92	100.00
Reeling enterprise	33,435	17,482	50,917	65.67	34.33	100.00
Weaving enterprise	95,055	113,036	208,091	45.68	54.32	100.00
Total	257,306	152,506	408,812	62.79	37.21	100.00

TABLE 5.5

SHARE OF FAMILY AND HIRED LABOUR IN TOTAL NUMBER OF HOURS
EMPLOYED BY THE SERICULTURE INDUSTRY DURING 1978-79

Types of enterprise	Number of hours worked			Share of family and hired labour as percentage		
	Family worker	Hired worker	Total	Family worker	Hired worker	Total
Planting enterprise	79,590	8,992	88,582	89.86	10.15	100.00
Rearing enterprise	973,985	178,615	1152,600	84.50	15.50	100.00
Reeling enterprise	243,864	150,760	394,624	61.80	38.20	100.00
Weaving enterprise	727,206	948,211	1675,417	43.40	56.60	100.00
Total	2024,645	1286,578	3311,223	61.14	58.86	100.00

From the above facts it may be concluded that in sericulture industry the scope of employment generation for family members is quite high. This conclusion may be confirmed if we take into consideration the employment intensity. Employment intensity is defined here as follows:

$$E_i = \frac{F_w}{P} \times 100$$

Where E_i = Employment intensity

F_w = Total family member employed in sericulture activities.

P = Total population comprising the family of the sericulture enterprise.

Employment Intensity for all types of sericulture enterprise is calculated in Table 5.6. As is evidenced by the table that the employment intensity of sericulture industry is 57.13%. The employment intensity is the highest in reeling enterprises employing about 61% of the total family members. Table 5.6 also shows that the employment intensity is the lowest in planting enterprise which performs only one stage of sericulture activity. The weaving enterprises also perform only one stage of activity but employs about 58% of the total family members. This is due to the fact that the weaving activity is round the year process while planting activity is seasonal. Among the sericulture activities the rearing activity is the most family labour intensive one. Table 5.6 shows that rearing enterprises performing two stages of sericulture activity employs 60.06% of the total family members while reeling enterprises performing one more stage of activity employs only 0.60% more family labour than the rearing enterprises. The rearing activity employs mostly the family female and child labour while there is little scope of child labour employment in reeling activity.

It is observed from different angles of employment that in sericulture industries the scope of providing employment to family members is very high. The enterprise carried on with family member is bound to be efficient as the workers think the enterprise as their own. Moreover, if sericulture industry develops it can absorb full working force of the family and thus solve the problem of seeking job elsewhere by the

TABLE 5.6

EMPLOYMENT INTENSITY OF FAMILY MEMBERS BY ENTERPRISE TYPE

Enterprise type	Total number of population in the family	Total number of working member in the family	Employment intensity
Planting enterprise	140	37	26.42
Rearing enterprise	1,029	654	60.06
Reeling enterprise	244	148	60.65
Weaving enterprise	533	307	57.60
Total	2,006	1,146	57.13

family members.

5.3 Scope of Employment for Hired Labour

Although the sericulture enterprise is a kind of family enterprise employing mostly the family members, the present survey shows that about 74% of total enterprise employs hired labour. But the share of hired labour in total employment as the table 5.3 shows in only 41.10%. This share, of course, varies widely among different types of sericulture enterprise. The Table 5.3 shows that the share of hired labour is the highest in weaving enterprise while it is the lowest in planting enterprise. It is because of the fact that the weaving activity is the most manufactural and commercial in nature among the sericulture activities and as such cannot profitably be carried on basing largely on family labour which is limited in supply. One interesting fact will be revealed if we look at Tables 5.3, 5.4 and 5.5 that only in the weaving enterprise the share of hired labour both in terms of number of person, number of day and number of hour is almost the same.

It may mean that in weaving enterprise both family and hired labour work almost the same number of day per year and same period of time per day.

5.4 Feminisation of Sericulture Industry

Most of the sericulture activities are performed by female and child workers as this type of activity does not involve any high technology. Children, women and even old people can learn quickly the skill required in carrying out sericulture activities. Moreover, most of the sericulture activities are carried on within the homestead boundary facilitating the participation of women and children in large numbers.

It is found in the present survey that except some planting enterprises each and every sericulture enterprise employs female labour. More than 36% of the workers employed in sericulture is found to be female where as the percentage of female worker in all rural industrial activities surveyed in the Phase I of the Rural Industries Study Project is found to be 34%. Number of male and female worker per sericulture enterprise is shown in Table 5.7. As it would appear from the table that on average about three female workers are employed per enterprise. This average varies widely among different types of sericulture enterprise. It would appear from Table 5.7 that the scope of providing female employment is the highest in the reeling industry which employs the highest number of female worker per enterprise. The planting enterprise has very little scope of employing female worker as the planting activity is carried on outside the homestead boundary where the women of Bangladesh most of whom use veil are restricted to go. Moreover, planting activity requires hard manual labour which women usually cannot withstand. The scope of female employment is also very high in weaving industry which employs more than 3 female worker per enterprise. But it would appear from the Table 5.7 that the scope of female employment is not as high in rearing industry as that in the reeling and weaving industry. It is mainly because of the fact that in rearing enterprises the scope of employing hired female worker is very little. Table 5.7 shows that the average number of family and hired female worker varies significantly

TABLE 5.7

NUMBER OF MALE AND FEMALE WORKER PER SERICULTURE ENTERPRISE

Types of enterprise	Number of male worker per enterprise			Number of female worker per enterprise		
	Family	Hired	Total	Family	Hired	Total
Planting enterprise	1.47	0.74	2.21	0.32	-	0.32
Rearing enterprise	2.00	1.08	3.08	2.10	0.52	2.62
Reeling enterprise	2.73	3.27	6.00	2.23	2.00	4.23
Weaving enterprise	2.26	3.00	5.26	1.91	1.31	3.22
Total	2.10	1.78	3.88	1.97	0.77	2.76

from each other in the rearing enterprise while these two averages vary a little from each other in the reeling and weaving enterprise. It means that the scope of employing female labour both family and hired is almost equal in reeling and weaving industry while it is not the same in rearing industry. The conclusion drawn from the facts presented in Table 5.7 will differ if the share of female worker in the total employment is taken into consideration. Table 5.8 shows the share of male and female labour in the total employment. It may be concluded from the facts presented in Table 5.8 that the scope of providing female employment is the highest in the rearing industry where female workers contribute about 44% of total employment. The same table shows that in reeling and weaving industry female workers contribute about 39% and 32% respectively. Rearing industry employs more family female labour than family male labour per enterprise while in all other types of sericulture industry family female worker per enterprise is less than family male workers per enterprise. These facts are shown in Table 5.7.

TABLE 5.8

SHARE OF MALE AND FEMALE LABOUR IN THE TOTAL NUMBER OF
WORKERS EMPLOYED BY THE SERICULTURE INDUSTRY DURING
1978-79

Types of enterprise	Share of different categories of male labour in total employment (in percentage)			Share of different categories of female labour in total employment (in percentage)		
	Family	Hired	Total	Family	Hired	Total
Planting enterprise	54.90	27.45	82.35	11.76	-	11.76
Rearing enterprise	31.42	16.92	48.34	31.53	9.51	41.04
Reeling enterprise	24.92	29.82	54.74	20.35	18.25	38.60
Weaving enterprise	21.06	27.94	49.00	17.76	12.18	29.94
Total	27.34	23.07	50.41	24.30	11.51	35.81

The share of female worker in the total employment will be less if employment in terms of day is taken into consideration. Because the female labour works lesser number of day per year than male labour as they have household involvement other than sericulture activity. Moreover, female labour are mostly employed seasonally while male labours are employed throughout the year in planting, rearing and reeling in successive sequence. But this does not hold for weaving activity which is not seasonal and where both female and male labour are employed throughout the year. As such in weaving industry there will be little difference between the share of female labour in total number of worker and that in total number of day worked. The share of male and female labour in the total employment in terms of day is presented in Table 5.9. It is apparent from Table 5.8 and 5.9 that in all types of sericulture industry the share of female labour in total employment in terms day is less than the share of female labour in terms of the number of worker.

TABLE 5.9

SHARE OF MALE AND FEMALE LABOUR (IN TERMS OF DAY WORKED)
IN TOTAL NUMBER OF DAY EMPLOYED BY THE SERICULTURE
INDUSTRY DURING 1978-79

Types of enterprise	Days worked by different categories of male labour as % of total days employed by sericulture industry			Days worked by different categories of female labour as % of total days employed by sericulture industry		
	Family	Hired	Total	Family	Hired	Total
Plantign enterprise	76.48	10.13	86.61	8.58	-	8.58
Rearing enterprise	51.88	9.76	61.64	27.32	4.53	31.85
Reeling enterprise	40.70	24.23	64.93	19.00	10.11	29.11
Weaving enterprise	22.53	27.04	49.57	18.40	12.56	30.96
Total	36.24	20.34	56.68	21.26	9.18	30.44

The difference is very wide in case of rearing and reeling activity. But this difference is narrowed down when final participation in terms of hour is taken into consideration (see Table 5.10). It is because of the facts that female labour works longer period per day than the male worker. Table 5.11 shows the average working hours done per day by male, female and child workers. As evidence by the table that both in cases of rearing and reeling enterprise the female labour works longer period per day than male labour. It may be concluded from the above facts that the scope of female employment is very high in rearing and reeling enterprise.

Percentage change of male female and child employment, both family and hired, over the period 1976-1979 is presented in Table 5.12. As it would appear from the table that female employment is showing an increasing trend over the whole period in all enterprises excluding planting enterprise. The highest rate of increase of female employment

TABLE 5.10

SHARE OF MALE AND FEMALE LABOUR (IN TERMS OF HOURS WORKED) IN TOTAL
NUMBER OF HOURS EMPLOYED BY SERICULTURE INDUSTRY DURING 1978-79

Types of enterprise	Hours worked by different categories of male labour as % of total number of hours worked in the sericulture industry			Hours worked by different categories of female labour as % of total number of hours worked in the sericulture industry		
	Family	Hired	Total	Family	Hired	Total
Planting enterprise	77.77	10.15	87.92	7.92	-	7.92
Rearing enterprise	49.55	10.15	59.70	29.73	4.60	34.33
Reeling enterprise	39.93	27.35	67.28	18.62	10.35	29.47
Weaving enterprise	22.79	30.48	53.27	17.85	10.63	28.48
Total	35.54	22.57	58.11	21.66	8.42	30.08

TABLE 5.11

AVERAGE WORKING HOURS DONE PER DAY BY MALE,
FEMALE AND CHILD LABOUR

Types of enterprise	Hours worked per day			
	Male	Female	Child	Total
Planting enterprise	8.30	7.55	7.08	8.18
Rearing enterprise	7.98	8.88	7.53	8.24
Reeling enterprise	8.03	8.09	4.23	7.85
Weaving enterprise	8.65	7.41	7.55	8.05
Total	8.30	7.99	7.35	8.08

TABLE 5.12

PERCENTAGE CHANGE IN EMPLOYMENT (DAYS) BETWEEN 1976-77 AND 1977-78, 1976-77
AND 1978-79, 1977-78 AND 1978-79

Types of enterprise	Family labour			Hired labour			A 1 1		
	Between 1976-77 & 1977-78	Between 1976-77 & 1978-79	Between 1976-77 & 1978-79	Between 1976-77 & 1977-78	Between 1976-77 & 1978-79	Between 1976-77 & 1978-79	Between 1976-77 & 1977-78	Between 1976-77 & 1978-79	Between 1976-77 & 1978-79
	1976-77 & 1977-78	1976-77 & 1978-79	1976-77 & 1978-79	1976-77 & 1977-78	1976-77 & 1978-79	1976-77 & 1978-79	1976-77 & 1977-78	1976-77 & 1978-79	1976-77 & 1978-79
Planting enterprise: Total	19.67	18.14	-1.27	-6.13	20.13	27.97	17.20	18.34	1.07
Male	24.44	22.74	-1.37	-6.13	20.13	27.97	20.80	22.43	1.35
Female	-2.36	-11.43	-8.82	-	-	-2.86	-11.43	-8.82	-
Children	0.00	18.18	18.18	-	-	-	0.00	18.18	18.18
Planting enterprise: Total	1.74	5.35	3.55	14.68	19.57	4.26	3.47	7.26	3.65
Male	1.15	2.54	1.38	14.96	14.89	-0.07	3.13	4.31	1.14
Female	1.58	7.73	6.05	0.65	14.03	13.29	1.45	8.58	7.03
Children	0.92	22.47	12.44	*	*	15.38	20.00	35.27	12.73
Planting enterprise: Total	2.54	7.54	4.88	87.66	70.56	-9.09	23.65	23.17	-0.39
Male	1.83	8.56	6.61	37.94	20.35	-12.75	14.45	12.68	-1.54
Female	-10.36	-12.05	-1.88	*	*	0.98	35.96	34.74	0.90
Children	151.00	203.50	17.64	-	-	-	158.00	203.50	17.60
Planting enterprise: Total	4.10	19.64	14.93	27.03	64.91	29.81	14.72	40.61	22.56
Male	4.17	21.22	16.37	29.97	67.81	29.11	16.15	42.86	22.99
Female	3.58	19.69	15.56	20.86	45.40	20.30	9.80	28.94	17.44
Children	5.69	12.51	6.46	27.76	79.77	20.25	56.87	30.46	-

Indicates that the % change is exceptionally large.

is achieved in the weaving industry. The second highest rate of increase is achieved in the rearing industry. Reeling industry also achieved an increase in female employment although total employment in this industry decreased a lot. In reeling industry male employment decreased which is partly compensated by the increase in female employment. In rearing and weaving industry male employment increased but this increase is several times lower than the increase in female employment. One interesting fact is revealed if percentage change of family and hired female labour employment is taken into consideration. In all types of sericulture enterprises excluding planting enterprise the increase of hired female labour employment is several times higher than the increase of family female labour employment.

From the above facts it may be concluded that sericulture industry is being femininised gradually and it will be wise to accelerate the rate of femininisation. Rearing activity could be femininised totally. Because it requires little skills which the woman can easily provide. Moreover, rearing activity is carried on within the homestead boundary which creates a proper atmosphere for work for women of Bangladesh who are conservation to go out. Reeling activity also could be femininised. Technique and skill required in reeling activity is not difficult enough for women to learn. Women can learn easily the reeling technique practice. Femininisation of these two activities will provide employment opportunity for a large number of village women in Bangladesh who are deplorably economically distressed.

5.5 Employment Scope for Child Worker

Child workers have been found to constitute about 14% of the total employment while they have been found to constitute only about 1.3% of the total employment in all rural industries surveyed in the Phase I of the Rural Industries Study Project (RISP, 1979). Out of this 14% family child worker constitutes 7.4% while the hired child workers constitute 6.3%. The share of hired child worker increases when employment in terms of day and hour is taken into consideration meaning that the hired child workers work more days and more hour per

year than the family child worker. Child labour participation in different types of sericulture activity is different as technology, skill and physical labour involved in different types of sericulture activity is different. Share of child labour in total labour by enterprise type is presented in Table 5.13. As it would appear from the table that the scope of family child labour employment decreases continuously as one moves from rearing to weaving enterprise.

TABLE 5.13

SHARE OF CHILD LABOUR IN THE TOTAL LABOUR EMPLOYED BY
THE SERICULTURE ENTERPRISE DURING 1978-79

Types of enterprise	Number of different categories of child labour as % of total number of labour employed by the sericulture industry			Number of day worked by different categories of child labour as % of total day employed by the sericulture industry			Number of hours worked by different categories of child labour as % of total hours employed by sericulture industry		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
Planting enterprise	5.88	-	5.88	4.80	-	4.80	4.14	-	4.15
Rearing enterprise	9.40	1.22	10.62	5.88	0.64	6.52	5.21	0.75	-
Reeling enterprise	6.67	-	6.67	5.96	-	5.96	3.26	-	3.26
Weaving enterprise	5.16	15.90	21.06	4.76	14.72	19.48	2.76	15.49	18.25
Total	7.37	6.30	13.67	5.29	7.69	12.98	3.71	8.10	11.81

The scope of family child employment is the highest in the rearing enterprise while the lowest in the weaving enterprise. The weaving entrepreneurs being economically most solvent among all sericulture entrepreneurs does not want his child to work rather he wants his child to go to school. But he compensates the shortage of family child labour by hiring child labour. Among the sericulture enterprises weaving enterprise employs the highest number of hired child labour.

As it would appear from Table 5.13 that the share of child labour in the total employment in terms of the number of worker does not vary much when their share in terms of number of day and number of hour worked is taken into consideration. It means that the child labour works almost the same number of days per year and the same number of hours per day as the male and female workers. But the share of child labour in terms of day and hours differ significantly when only family child labour is taken into consideration. It is due to the fact that the family child labour works fewer days per year and fewer hours per day than the hired child labour.

5.6 Wage Rate

Average wage per day paid to different categories of hired labour is calculated at about ten taka from the facts available in the present survey. But this average varies significantly between different categories of hired labour and between different categories of sericulture activities. Average daily wage rate for different sericulture activities is calculated in Table 5.14. It can be seen from the table that rate of wage is the highest/weaving enterprise while the lowest in the planting enterprise. Table 5.14 also shows that in rearing industry, wage paid to male labour does not vary significantly from the wage paid to female labour. It may mean that in rearing industry both male and female labour do almost the same kind of job and as such there is little difference in wage rate paid to them. But wage rate paid to male and female labour varies significantly in reeling industry where male and female labour do different types of job. The same is the case with the weaving industry where wage of male labour is several times higher than that paid to the female labour.

TABLE 5.14

WAGE RATE PER DAY IN THE SERICULTURE INDUSTRY

Enterprise type	Male	Female	Children	All
Planting enterprise	6.34	-	-	6.34
Rearing enterprise	8.81	7.12	2.20	8.03
Reeling enterprise	9.23	6.32	-	8.37
Weaving enterprise	17.28	5.11	3.28	10.30
Total	14.56	5.11	3.25	9.75

It is interesting to observe from Table 5.14 that the wage of female labour is decreasing continuously as one moves from rearing industry to weaving industry while just opposite is the case with the wage of male labour. May it be explained as that the more the nature of activity becomes manufactural the more activities are undertaken by the male labour leaving few light job for female labour which brings them little wage.

5.7 Daily Working Period

Average working hour per day for male, female and child both family and hired is presented in Table 5.15. It is interestingly observed from the table that in all cases except in weaving enterprise female labour works longer period per day than male labour. The table is revealing another fact that the enterprise operated exclusively by family members employs lesser number of hours per day than that employed by the enterprise operated both by family and hired worker. It means that family member works lesser number of hours per day than that worked by the hired labour. But family member's working period increases when hired labour is employed. It would appear from Table 5.15 that in all types of sericulture enterprise, family members working together with hired labour employs more hours than they employ while working

TABLE 5.15

AVERAGE NUMBER OF HOURS WORKED PER DAY BY DIFFERENT TYPES OF WORKERS IN THE ENTERPRISE
EMPLOYING ONLY FAMILY LABOUR AND IN THE ENTERPRISE EMPLOYING BOTH FAMILY AND
HIRED LABOUR

Enterprise type	Enterprise employing family labour only				Enterprise employing family and hired labour							
	Male	Female	Children	Total	Family labour				Hired labour			
					Male	Female	Children	Total	Male	Female	Children	Total
Planting enterprise	9.23	8.07	4.00	9.14	8.59	4.00	8.00	8.28	8.19	-	-	8.19
Rearing enterprise	7.90	8.53	4.84	7.95	8.85	9.14	8.00	8.28	8.57	8.87	9.60	8.55
Reeling enterprise	7.00	8.00	-	7.43	7.78	8.05	5.49	7.71	8.98	9.28	-	9.07
Weaving enterprise	7.85	7.26	3.58	6.57	8.19	7.88	7.85	9.07	6.81	8.47	8.15	-
Total	7.93	8.17	3.99	7.61	7.95	8.32	6.29	7.94	8.97	7.41	8.50	8.49

exclusively from hired labour. From this fact it may be concluded that the employment of hired labour makes all labours work more hours which results more production. But working more hour does not always mean more production. Therefore, to confirm this conclusion let us take into consideration the value added per enterprise employing family labour only and the value added per enterprise employing family labour together with hired labour. Value added for both these types of enterprise is shown in Table 5.16. The table shows that value added per enterprise increases in all types of sericulture enterprise when carried on with family labour together with hired labour. If value added per enterprise is the exponent of the efficiency of labour then it can easily be concluded from the facts presented in Table 5.16 that efficiency of labour increases when hired labour is employed. In other way it may be concluded

TABLE 5.16

VALUE ADDED PER ENTERPRISE

Enterprise type	Enterprise employ- ing family labour only	Enterprise employ- ing family and hired labour	All
Planting enterprise	2,393	2,506	2,441
Rearing enterprise	2,550	4,154	3,646
Reeling enterprise	7,548	15,791	15,157
Weaving enterprise	24,670	52,272	48,875
Total	5,356	20,331	16,409

that law of increasing return operates in the sericulture enterprise as more and more labours are employed. The operation of the law of increasing return is highly significant in reeling and weaving enterprise where value added increases several times when operated by family and hired labour together. But this conclusion will be confirmed only when the value added per worker increases with the increase of the number of worker.

Output labour ratios representing the value added per worker is shown in Table 5.17. As is evidenced from the table that value added per day per worker increases in all types of sericulture enterprise when operated by family labour together with hired labour. It is apparent from this fact that productivity of labour increases as more and more labour is employed and thus expansion of sericulture industry will create profitable job opportunity for large number of village people.

TABLE 5.17

OUTPUT LABOUR RATIOS

Types of enterprise	Value added per worker when operated by family member only	Value added per worker when operated by family member together with hired labour	All
Planting enterprise	3.67	5.48	4.28
Rearing enterprise	3.23	3.86	3.73
Reeling enterprise	3.55	8.10	7.74
Weaving enterprise	13.42	15.41	15.27
Total			8.72

CHAPTER VI

F I N A N C E6.1 Introduction

Investment requirement in sericulture industry is relatively small. Fixed capital required for sericulture industry includes various tools, equipment and machineries which are entirely home built by the village carpenter and blacksmith and with material available locally. Working capital requirement also is not so big. From these facts it may be inferred that finance is perhaps not a problem for sericulture industry. But the information collected on finance in the present survey does not confirm this inference. The sericulture entrepreneur especially, the planting and rearing entrepreneurs are so poor that in most cases they can not arrange necessary finance for carrying out their activities. They have to go either to the money lender or friends or relations for finance as there is no institutional set up for financing sericulture industry. Recently an arrangement has been made for issuing institutional loan to the sericulturist through Swiss - Bangladesh Bilateral Project and the Crash Programme. During the year 1979-80 Bangladesh Krishi Bank advanced a sum of Tk. 34.34 lakh as medium term loan to 1,115 sericulture farmers¹. But through these programmes institutional loan will be given only to them who are going to start sericulture activity afresh. Very insignificant number of sericulturist of Bholahat and Shibgonj received institutional loan. In the present survey it is observed that only three rearing enterprises and two weaving enterprises received loan from the Bank.

6.2 Initial Capital

It is observed while conducting the present survey that in most cases the sericulture entrepreneurs could not respond properly to the question as to how much initial capital did they need to start their business.

¹/ Draft Annual Report, 1979-80, Bangladesh Krishi Bank.

Mainly this is because of the fact that sericulture business passes down from grand-father to father, father to son and so on and so forth. Hence, it is nothing unnatural on their part to find no answer to such questions as when and how much money was invested to start their business. The sericulture entrepreneurs who could answer to this question started business with fresh initial capital after their father's business was lost due to either liberation war or migratory reason. Most of the weaving entrepreneur however, could tell the amount of initial capital they needed to start their business. Because the weaving enterprises were badly affected by the 1971 liberation war. And after 1971 they started their business afresh.

Table 6.1 shows the requirement of initial capital per sericulture enterprise. In calculating the initial capital per enterprise only those enterprises where the entrepreneur could tell the amount of initial capital, are taken into consideration. As is evidence by the Table that initial capital requirement is the smallest for planting enterprise while it is the largest for weaving enterprise. Sources of initial capital are presented in Table 6.2. The largest share of the initial capital as is shown by Table 6.2, comes from the savings from other sources of income which include service, business etc. The table shows that about 25% of total initial capital is contributed by this source.

TABLE 6.1

REQUIREMENT OF INITIAL CAPITAL PER ENTERPRISE

Enterprise type	Initial capital (in Tk.) per enterprise
Planting enterprise	41,071
Rearing enterprise	7,936
Reeling enterprise	10,213
Weaving enterprise	11,413

TABLE 6.2

PERCENTAGE DISTRIBUTION OF INITIAL CAPITAL BY MAIN
SOURCE AND ENTERPRISE TYPE

Source of initial capital	Planting enter- prise	Rearing enter- prise	Reeling enter- prise	Weaving enter- prise	Total
Inherited	11.46	25.06	11.33	21.04	20.70
Dowry	-	-	-	6.66	0.49
Saving from Agriculture	25.00	22.11	19.52	3.19	8.38
Saving from other source	55.21	36.01	33.11	20.63	24.59
Selling land	8.33	6.74	19.11	18.73	16.74
Selling other assets	-	3.00	15.56	3.66	4.58
Loan	-	1.15	-	32.08	23.93
Others	-	2.93	1.37	-	0.59
Total	100.00	100.00	100.00	100.00	100.00

Planting and rearing enterprise obtained largest amount of initial capital they required from this source. The next important source of initial capital is loan from money lender and relatives.

The weaving enterprises obtained largest amount of their required initial capital (32% of total initial capital the weaving enterprises requires) from this source. The planting and reeling enterprise did not obtain any initial capital from this source while rearing enterprise obtained a very small amount of initial capital from this source. About 17% of total initial capital requirement is obtained from selling land. Reeling and weaving enterprise obtained a large amount of initial capital from this source. Savings from agriculture also plays an important role in providing initial capital. This source is almost equally important for planting, rearing and reeling enterprises.

It is observed from the above discussion that the sericulture entrepreneur excluding the weaving entrepreneur somehow managed to obtain initial capital from their own source of capital. It is mainly due to the absence of any institutional source of capital. Capital obtained from their own source is very small and as such they cannot start their business in large scale.

6.3 Current Capital

Structure and size of fixed capital and requirement of working capital which are the components of current capital are already discussed in the third chapter of this report. Sources of this capital are shown in Table 6.3. As it would appear in the table that the largest part of working capital required for sericulture industry comes from personal saving. Among the sources of personal savings sericulture plays the dominant role. As the table shows that more than 51% of the total working capital required for sericulture industry comes from sericulture itself. Savings from agriculture provides only about 4% of the total requirement of working capital.

Among all enterprises the reeling enterprise obtain maximum amount of their necessary working capital from sericulture. Next important source of working capital is 'Dadan'.^{1/} The sericulture enterprises obtain 'Dadan' by selling their product in advance. About 28% of total working capital comes from 'Dadan'. 'Dadan' exploits the sericulturists with the help of a two-pronged attack-giving low price for sericulture products and charging high price for the raw materials supplied. The price charged through Dadan system varies widely from the market price. The extent of variation of price ranges between 10% to more than 30%. The weaving enterprises in largest numbers obtain working capital from this source. The rearing and planting enterprises also obtain a large

^{1/} 'Dadan' is a local name of the loan which is obtained by selling product in advance. Dadan may, also be described as forward selling.

amount of working capital from this source. But, the 'Dadan' system can not make its two-pronged attack on the reeling enterprises. Table 6.3 shows that the reeling enterprise obtained only 0.04% of total working capital requirement from this source. Money lender also plays a very insignificant role in providing working capital to the reeling enterprises. But this source of working capital is very important for planting enterprises. The planting enterprises obtain more than 16% of their working capital from this source whereas rearing and weaving enterprises respectively obtain from the same source 9% and 7% of their required working capital.

It is clear from the above discussion that most of the working capital for sericulture industry comes from non-institutional sources. It is wellknown that the interest rate charged on non-institutional loan varies between zero to more than two hundred per cent. In many cases hardship the sericulturists suffer in taking loan from non-institutional sources cannot be valued in terms of money. Because the money lender, with the power of money lending rule the borrower not only economically but also socially and politically.

This situation should not be allowed to continue. There must be an well organised credit system embracing all sectors of sericulture industry to save the sericulturists from the clutches of the friend/relative, money lender and 'Dadan'. Otherwise a lion share of the income of sericulture sector will go to them who are not really sericulturists.

6.4 Problems Involved in Obtaining Institutional Loan - the Entrepreneurs' Views

The following problems were specially mentioned by the sericulture entrepreneurs when, during the present survey, they were posed with questions regarding the problems they face while trying to get institutional loan:

- i) No allocation of credit for sericulture sector
- ii) Long chain of official formalities
- iii) Loan against the security of land

- iv) Fear of losing security in case of inability to repay the loan
- v) Unofficial payment in obtaining institutional loan
- vi) Ignorance about the availability of loan
- vii) Lack of security
- viii) High rate of interest

Table 6.4 gives numerical information on these problems. The table shows that as large as 33.14% of enterprise mentioned the problems of lack of security. More than 23% of the total enterprises does not know about the availability of institutional loan. About 23% of the enterprises mentioned that official formalities required in obtaining institutional credit is the biggest problem they face. More than 15% of the enterprises mentioned that they have to make big amount of unofficial payment if they like to obtain loan from the institutional source. One interesting fact will be revealed if one takes into consideration the last column of the Table 6.4. It is exposed that the percentage of enterprise facing different problems is increasing as one moves from planting to weaving activities. It is because of the fact that the entrepreneur will require more loan as more stages of activities he undertakes and thus faces more problems. It is also because of the fact that as the activity becomes more manufactural in nature more loan is needed and thus face more problems.

All the problems described above should be removed by a comprehensive and well organised credit system. Economics - based rather than security oriented approach is necessary in financing sericulture industry as in most cases this industry is a poor mans' business. Official formalities involved in obtaining institutional loan should be made simple as most of the people engaged in sericulture industry are devoid of formal education. There must be a concessional rate of interest to give relief to the poor sericulturists.

TABLE 6.4

DISTRIBUTION OF SERICULTURE ENTERPRISE FACING DIFFERENT
PROBLEMS IN OBTAINING INSTITUTIONAL LOAN

Types of enterprise	No allocation of credit for sericulture	Official formalities	Land security	Non-official	Ignorance	Lack of security	Fear of losing collateral	High rate of interest	No assurance	Total
Planting enterprise	-	2 (28.57)	-	1 (14.29)	1 (14.29)	-	4 (57.14)	-	-	7 (36.84)
Rearing enterprise	-	16 (17.02)	3 (3.19)	7 (7.45)	19 (20.21)	11 (11.70)	38 (40.43)	7 (7.45)	1 (1.06)	94 (66.20)
Reeling enterprise	5 (16.67)	6 (33.33)	1 (5.56)	5 (27.78)	-	-	10 (55.56)	-	-	18 (69.23)
Weaving enterprise	-	14 (28.30)	-	13 (26.00)	19 (38.00)	3 (6.00)	4 (8.00)	-	1 (2.00)	50 (76.92)
Total	3 (1.78)	38 (22.79)	4 (2.37)	26 (15.38)	39 (8.28)	14 (33.14)	56 (4.14)	7 (1.18)	2	69 (67.06)

CHAPTER VII

MARKETING

7.1 Procurement of Raw Materials

Raw materials required for sericulture industry are locally available since it is totally an agro-based industry. There are mulberry producers who sell mulberry leaves directly to the cocoon rearer. Cocoon rearer on the other hand sells cocoon in most cases directly to the silk reeler. But the relationship between the producer of raw materials and the user of raw materials is not so direct in case of the procurement of silk yarn which is the main raw materials for silk weaving. Table 7.1 shows the percentage distribution of purchased raw materials by source. As it would appear from the table that weaving enterprises procure only about 8% of the total raw materials they required from the direct producer. Whereas this source supplies 89%, 88% and 96% of total raw materials required by the planting, rearing and reeling enterprise respectively.

Middle-man has no role to play in supplying raw materials to the planting and rearing enterprise. This source plays an insignificant role in supplying raw materials to the reeling enterprise but a great role in supplying more than 33% of total raw material to the weaving enterprise. Local trader also plays a great role in supplying raw materials to the weaving enterprise. It can be seen from Table 7.1 that the local trader supplies about 51% of total raw materials required by the weaving enterprise. This source supplies only 2.63% and 2.17% of total raw materials required by the rearing and reeling enterprise respectively. But this source plays a significant role in supplying 11% of total raw materials to the planting enterprise. The planting enterprise procures chemical fertilizer from this source. Sericulture Board is an important supplier of raw materials to the planter and rearer. Sericulture Board supplies mulberry cuttings to the planter. But it does not appear in the table as the Board supplies mulberry cuttings free of cost. The sericulture Board is the sole supplier

TABLE 7.1

PERCENTAGE DISTRIBUTION OF PURCHASED RAW
MATERIALS BY SOURCES

Enterprise type	S o u r c e s						Total
	Directly from pro- ducer	Middle- man	Local Tra- der	Coope- ratives	Sericult- ure Board	Cre- ditor	
Planting enterprise	89.00	-	11.00	-	-	-	100.00
Rearing enterprise	87.82	-	2.63	0.12	6.51	2.92	100.00
Reeling enterprise	94.03	0.07	2.17	-	3.68	0.05	100.00
Weaving enterprise	7.66	33.13	50.69	1.55	-	6.98	100.00
Total	14.45	29.35	47.15	1.38	10.38	6.29	100.00

of different varieties of layings. It accounts 6.5% of the total raw materials requirement of the rearing enterprise. The Board also supplies disinfectants and pathological service to the rearer but free of cost. The reeling enterprise procure layings and cocoon waste from the sericulture Board. It accounts about 4% of its total raw materials requirements.

Creditor or Mahajan is another important supplier of raw materials to the rearing enterprise. This source also plays a significant role in supplying raw materials to the weaving enterprise. It can be seen from Table 7.1 that rearing and weaving enterprise procure respectively about 3% and 7% of their total raw materials requirement from this source whereas reeling enterprises procure only 0.05% of their total raw materials requirement from this source. Table 7.2 is there to show the number of enterprise purchasing raw materials from the creditor at a price (%) higher than that in the market. The difference between the market price and the price paid by the sericulture enterprise to

the creditor ranges between 1% to more than 25%. As it evidenced by the table that about 33% of the rearing enterprise purchasing raw materials on credit pay upto 10% higher price than that in the market while more than 62% of the rearing enterprise in this group pays 10% to 25% higher price. But only 38% of the weaving enterprise purchasing raw materials on credit, pays 10% to 25% higher price while more than 51% of weaving enterprise in this group pays upto 10% higher price. Hence, creditor as a raw material supplier exploits rearer more than

TABLE 7.2

NUMBER OF ENTERPRISE PURCHASING RAW MATERIALS FROM THE CREDITOR AT A PRICE (%) HIGHER THAN THAT IN THE MARKET

Enterprise type	Number of enterprise purchasing raw materials from the market	Number of enterprise paying different higher prices				
		Same as market	Upto 10% lower	10%-15% higher	15%-25% higher	More than 25% higher
Planting enterprise	-	-	-	-	-	-
Rearing enterprise	37	-	12	10	13	2
Reeling enterprise	1	-	-	-	1	-
Weaving enterprise	37 (100.00)	-	19 (51.35)	10 (27.03)	4 (10.81)	4 (10.81)
Total	75 (100.00)	-	31 (41.33)	20 (26.67)	18 (24.00)	6 (8.00)

the exploits the weaver. But the extent of exploitation by the creditor does not end here. The rearing and weaving enterprises have to procure raw materials on credit from the purchaser of their product. It is actually forward selling of their product in exchange of raw materials. It has been observed in the present survey that about 13% of rearing

enterprise and more than 42% of weaving enterprise purchase raw material on credit from the purchaser of their product at different higher prices (which range between 10% to 25% higher price). They also have to receive significantly lower price for their product sold forward to the raw materials supplier compared to market price.

7.1.1 Problems Involved in Procurement of Raw Materials

Procurement of raw materials is a big problem facing the sericulture entrepreneur. It is already described how the creditor and purchaser of product exploit the sericulture entrepreneur. Local trader and the Sericulture Board as the supplier of raw materials also exploit the sericulture entrepreneur. Table 7.3 shows the percentage of different sericulture entrepreneur facing problem in procuring their necessary raw materials. The weaving entrepreneur in largest number mentioned that they face trouble in getting principle raw materials. Silk yarn is the principle raw materials for silk weaving. There are many tricks involved in getting raw silk. Generally the wealthy weavers quickly get adapted to these tricks and manage to get all allotment of silk yarn from the Sericulture Board and BSCIC. Latter they take the role

TABLE 7.3

PERCENTAGE OF ENTREPRENEUR MENTIONING PROCUREMENT OF
RAW MATERIALS IS A TROUBLE SOME JOB

Enterprise type	No. of enterprise	Percentage
Planting entrepreneur	5	26.32
Rearing entrepreneur	61	42.96
Reeling entrepreneur	4	16.15
Weaving entrepreneur	43	66.15
Total	113	44.84

of local trader and sell silk yarn to the poor weaver at high price. It is generally because of the fact that there involved a long list of official formalities in procuring silk yarn from the Board and BSCIC and these formalities are not easily understandable to the poor and uneducated weavers.

More than 46% of reeling entrepreneur mentioned that procurement of raw materials is a trouble-some job for them. But creditor and purchaser of product have no role to play in supplying raw materials to the reeling enterprise and thus, the reeling entrepreneur are free from exploitation by these two groups of raw material supplier. They face much trouble from the Sericulture Board. Procurement of cocoon which is the principle raw materials for reeling activity, become trouble-some due to the Sericulture Board's policy of compulsory purchase of cocoon from the cocoon rear (which has previously mentioned several times in this report). In addition to this problems, the reeling enterprise faces problem in purchasing cocoon from the market in the absence of determined standards of quality and standard method of testing for classifying cocoon into quality grades. Cocoon in a given lot selected for reeling must be of one variety and one quality otherwise reeling will bring serious losses to the reeling enterprise.

The Sericulture Board as the supplier of raw materials also creates problem to the rearing enterprise. The Sericulture Board is the sole supplier of disease free quality layings. But during the present survey the investigators, in many cases had to listen to the complain that the rearers do not get supply of layings in proper time. The rearer also complained that there is unofficial payment system in getting layings from the Sericulture Board. He, who makes this payment get layings in time. Such a payee also get superior quality layings. The production of improved variety layings in the nurseries is very low. Therefore competition involved in getting improved variety laying is very tough and the entrepreneur who can make unofficial payment win the race. Percentage of sericulture entrepreneur mentioning various problem created by the Sericulture Board is enlisted in Table 7.4. Other problems which are created by the Sericulture Board in the raw

material market for sericulture industry are shortage of supply of disinfectant materials by Sericulture Board and supply of inferior quality layings.

TABLE 7.4

PERCENTAGE OF ENTREPRENEURS MENTIONING DIFFERENT
PROBLEMS CREATED BY SERICULTURE BOARD (\$SB)

Entrepreneur type	Delay in supplying layings by SB	Short of disinfectant materials supplied by S.B.	Supply of inferior quality laying by S.B.
Rearing entrepreneur	12	44	38
Reeling entrepreneur	4	42	15
Total	11	44	35

High price of raw material is another problem facing the sericulture entrepreneur. More than 40% of the entrepreneur mentioned this problem. Among them the rearing and weaving entrepreneur in large number mentioned this problem. For smooth running of sericulture activities all these problems of raw material procurement should be solved through a well organized notified market for raw materials.

7.2 Marketing of Different Sericulture Product

7.2.1 Marketign of Mulberry Leaves

The marketign system of mulberry leaves is very simple. On the selling side there are three groups of people namely, mulberry planter, cocoon rearer and silk reeler. On the buying side, on the other hand, there are four groups of people namely cocoon rearer, silk reeler, money lender and supplier of raw materials. All these types of buyer

and seller happen to be within the same village and come into direct contact with each other through an irregular open market system.

Production and sale of mulberry leaves per enterprise is shown in Table 7.5. As it would appear from the table that planting entrepreneurs sell whole lot of their production while rearing and reeling entrepreneurs sell respectively 1.28% and 0.77% of their total production of mulberry leaves.

TABLE 7.5

PRODUCTION AND SALE OF MULBERRY LEAVES PER ENTERPRISE

Enterprise type	Production per enterprise (in maunds)	Sale per enterprise (in maunds)	Sale as % of production
Planting enterprise	65.21	65.21	100.00
Rearing enterprise	123.69	2.26	1.28
Weaving enterprise	0.77	0.00	0.00

Table 7.6 presents the percentage distribution of enterprise by major purchaser of mulberry leaves. As is shown by the table that rearing enterprise happens to be the largest buyer of mulberry leaves. About 79% of the enterprise (who sells mulberry leaves) sell mulberry leaves to the rearing enterprise. Money lender or Mahajan also plays a significant role in buying mulberry leaves. It would appear from the table that about 16% of the enterprise sells mulberry leaves to the Mahajan.

TABLE 7.6

PERCENTAGE DISTRIBUTION OF ENTERPRISE BY MAJOR
PURCHASER OF MULBERRY LEAVES

Purchaser of product	Percentage of enterprise selling mulberry leaves to different purchaser
Rearing enterprise	78.95
Reeling enterprise	10.26
Money lender or Mahajan	15.79
Supplier of raw materials	5.29

Total production, total sale and total purchase of mulberry leaves as covered by the present survey are shown in Table 7.7. As it would appear from the table that the planting enterprises supply 77% of the total sale of mulberry leaves while they produce only 4.88% of total production reported in the present survey. The rearing enterprise produce more than 69% of total production but supply only 20% of the total sale of mulberry leaves. The reeling enterprise is the smallest supplier of mulberry leaves in the market. It supplies a little more than 3% of the total saleable mulberry leaves. It is already mentioned that the rearing enterprise is the biggest buyer of mulberry leaves. The Table 7.8 shows that rearing enterprise buys more than 81% of the total purchase of mulberry leaves reported in the present survey. It accounts about 24% of total mulberry leaves required by the rearing enterprise. The reeling enterprise buys only 18.78% of total purchase. But reeling enterprise, although it buys and sells a very small amount of mulberry leaves, rules the mulberry market in terms of price. Table 7.8 shows the quantity of mulberry leaves sold and purchased at different prices. As it would appear from the table that the reeling enterprise in better position both on selling and buying side. This is because of the fact that in many cases it is noticed in the present survey that the reeling enterprise with their trade of money lending can easily influence the market mechanism.

TABLE 6.7

Enterprise type	Total production (in maund)	Total Sale (in maunds)	Total purchase (in maunds)	Purchase as % of total requirement
Planting - enterprise	1239 (4.88)	1239 (76.96)	-	-
Rearing enterprise	17564 (69.21)	321 (19.94)	5355 (81.22) <	23.70
Reeling enterprise	6525 (25.71)	50 (3.10)	1238 (18.78)	16.05
Weaving enterprise	50 (0.20)	-	-	-
Total	25378 (100.00)	1610 (100.00)	6593 (100.00)	21.72

Figures within parentheses are the percentage of column total.

TABLE 7.8

QUANTITY OF MULBERRY LEAVES SOLD AND PURCHASED AT
DIFFERENT PRICES

Price per maund	Quantity (in maund) sold by				Quantity (in maund) purchased		
	Plant- ing	Rear- ing enter- prise	Reel- ing enter- prise	Total	Rearing enter- prise	Reeling enter- prise	Total
Below Tk.30	80 (6.46)	32 (9.97)	-	112 (6.96)	58 (1.08)	-	58 (0.88)
30	50 (4.04)	259 (80.69)	-	309 (19.19)	2017 (37.67)	910 (73.51)	2927 (44.40)
35	125 (10.09)	-	-	125 (7.76)	266 (4.97)	45 (3.63)	311 (4.72)
40	584 (47.13)	-	-	584 (36.27)	2229 (41.45)	223 (18.01)	2452 (37.19)
45	-	-	-	-	25 (0.47)	-	25 (0.38)
50	400 (32.28)	30 (9.35)	50 (100.00)	480 (29.81)	760 (14.19)	60 (4.85)	820 (12.44)
Total	1239 (100.00)	321 (100.00)	50 (100.00)	1610 (100.00)	5355 (100.00)	1238 (100.00)	6593 (100.00)

Note: Figures within parentheses are the percentage of column total.

7.2.2 Marketing of Cocoon

Cocoon is marketed through Sericulture Board and also through the open market system. In both cases sellers are the rearing and reeling enterprises. The weaving enterprises also sell cocoon but a very little amount. Sellers are identified in Table 7.9. Table 7.10 is showing production, sale and purchase of cocoon. As the table show that rearing and weaving enterprise sell the whole lot of their cocoon production as they do not have reeling activity which needs cocoon as the principles raw materials. Reeling enterprise sells very small amount of cocoon as compulsorily required by the Sericulture Board.

The table identifying the pruchaser of cocoon shows - that the local trader and the middle-man are the most dominant buyer of cocoon. The table shows that more than 65% of cocoon producer sell their product to the local trader and middle-man. Sericulture Board with a view to establish a notified market for cocoon initiated a programme of buying cocoon from the cocoon producers. The Board is supposed to supply disease free quality laying to the rearer at minimal price and the rearer in exchange bound to sell cocoon to the Board. Board is supposed to buy cocoon directly from the cocoon producers. But as it is shown by Table 7.10 that only 30% of cocoon producer can sell directly to the Sericulture Board. The procurment team appointed by the Sericulture Board does not go in person to the cocoon producer to pruchase cocoon. The procurement team prefer purchase of cocoon from the middle-man to purchase from the cocoon producer as the latter involves tendeous journey. In many cases cocoon producers like to sell their product to the procurement team showign themselves upto the procurmeent centre. But many respondents of the present survey reported that the producer have no easy access to the procurement team as there is a compromise between the local trader and the procurement team which forces the cocoon producer to sell their produce to the local traders. The cocoon producer does not get the price fixed by the Sericulture Board because of the existence of large number of middle-man between the procurement team and the cocoon producer. The price for them varies between Tk. 12.00 to Tk. 45.00 per kahan.

TABLE 7.9

PRODUCTION AND SALE OF COCOON PER ENTERPRISE

Seller of cocoon	Total production of cocoon (in maund)	Total sale (in maund)	Sale as % of total production	Total purchase by reeling enterprise	Purchase as % of total requirement
Reeling enterprise	844	844	95.37	-	-
Reeling enterprise	308	39	4.41	400	59.79
Weaving enterprise	2	2	0.22	-	-
Total	1154	885		400	

TABLE 7.10

PERCENTAGE OF COCOON REARER SELLING COCOON TO DIFFERENT PURCHASER

Purchaser of cocoon	No. of cocoon producer selling cocoon to different purchase	Percentage
Reeling enterprise	66	39.50
Directly to Sericulture Board	51	30.06
Money lender or Mahajan	66	39.50
Local trader and middlemen	110	65.50
Supplier of raw material other than layings	59	35.21
Others	9	5.20

The weighing system used by the Sericulture Board in purchasing cocoon is not understandable to the cocoon rearer. The middle-man takes the opportunity of this ambiguous weighing system and thereby try to cheat both the cocoon rearer and the Sericulture Board's representative by playing a magic game of weight technique¹.

Money lender is another dominant purchaser of cocoon. Table 7.10 shows that more than 39% of total rearer sell their product to the money lender. Table 7.11 shows the number of different types of sericulture enterprise setting product to money lender at a price lower than that in the market. It can be seen from the table that 56 rearing enterprise accounting about 40% of total rearing enterprise sell their product to the money lender and receive lesser price than that in the market. The table also shows that most of the rearing enterprise selling cocoon to the money lender are bound to sell at a price 15% to 25% less than that in the market.

The Sericulture Board initiated the procurement system to protect the cocoon producers from the clutches of the local traders middle-man and money lenders. But the present survey shows that procurement system does not abolish these groups of buyer rather this system increases the power of these buyer by extending the chain of middle-man between the Sericulture Board and the cocoon producer and by introducing the ambiguous weighing measure.

^{1/} The middle-men buy cocoons from the rearers by using the measure maund which equals 40 kgs instead of 40 seers. Thus, they gain more than 6 lbs. per maund. They gain more in weight per maund when they sell cocoons to the Sericulture Board representative by using the measure kahan (a local measure equalling 1280 pieces). The Sericulture Board sets the price per kahan according to the weight of a cocoon in grames. Cocoons of a better quality have more weight and priced more. But the middle-men buy cocoons from the cocoon rearer paying the same price irrespective of quality. Thus, they gain in price as well. They also gain when they cheat the Sericulture Board representative in respect of the quality of cocoons. They mix some better quality cocoons with inferior quality cocoons. When the Sericulture Board representative weights a sample of cocoons to decide the weight in grames and to set price they tactfully manage to make him weigh the better quality cocoons which are picked by them from the bag containing mostly inferior quality cocoons. The price is accordingly set and thus inferior quality cocoons are sold at the price of better quality cocoons.

TABLE 7.11

NUMBER OF SERICULTURE ENTERPRISE SELLING PRODUCT TO THE MONEY
LENDER AT A PRICE LOWER THAN THAT IN THE MARKET

Enterprise type	No. of enterprise selling to creditor	No. of enterprise receiving lower price offered by the creditor				
		Same as market price	Upto 10% lower	10% to 15% lower	15% to 25% lower	More than 25% lower
Planting enterprise	4	-	2	1	1	-
Rearing enterprise	56 (100.00)	-	4 (7.14)	20 (35.71)	30 (63.37)	3 (3.57)
Reeling enterprise	3 (100.00)	-	1 (33.33)	2 (66.66)	-	-
Weaving enterprise	18 (100.00)	-	12 (63.16)	4 (21.05)	2 (10.53)	-
Total	82 (100.00)	-	19 (23.17)	27 (32.92)	33 (40.25)	2 (2.44)

Note: Figures within parantheses are the percentage of the enterprise selling product to the creditor at a price lower than that in the market.

TABLE 7.12

NUMBER OF SERICULTURE ENTERPRISE SELLING PRODUCT TO THE SUPPLIER OF
RAW MATERIALS AT A PRICE LOWER THAN THAT IN THE MARKET

Difference between market price and the price offered by the supplier of raw materials (in percentage)	Types of enterprise				
	Planting enterprise	Rearing enterprise	Reeling enterprise	Weaving enterprise	Total
Upto 10%	1 (5.56)	4 (2.82)	1 (3.85)	9 (13.85)	15 (5.95)
10% - 20%	-	39 (27.46)	4 (15.38)	1 (1.54)	44 (17.46)
20% and above	-	7 (4.93)	-	2 (3.08)	9 (3.57)
Total	1 (5.56)	50 (35.21)	5 (19.23)	12 (18.46)	68 (26.98)

Figures within parentheses are the percentage of different groups of sericulture enterprise.

Table

The/7.12 presented in the previous page shows the number of enterprise selling product to the supplier of raw materials at a price lower than that in the market. As it would appear from the table that more than 35% of rearing enterprise sell their product to the supplier of raw material. The table also shows that among the sericulture enterprise, the rearing enterprise is the largest in number of sell to the raw material supplier. It is also largest in number to sell to the local trader and money lender. Thus, rearing enterprises are in most deplorable condition in sericulture market.

Credit sale is another problem facing the rearing enterprise. More than 45% of the rearing enterprise in the present survey reported that they sell on credit. Table 7.13 in the next page shows the number of rearing enterprise sellign product on credit and percentage of total product sold on credit at different length of payment time. As the table shows that most of them sell 50% to 75% of th eir total product on credit. Payment period varies between 7 days to more than 30 days. The table shows that maximum number of rearing enterprise receive payment for their product between 22 to 30 days after sellign their product.

7.2.3 Price of Cocoon

The price offered by the Sericulture Board for cocoon it purchases, is fixed by a committee headed by the S.D.O. of Nawabganj subdivision of Rajshahi district. Sericulture Board's officials and two representatives from the cocoon rearer are members of the committee. Durign the present survey the field investigators have to listen to many complains from the cocoon rearer against this price fixing committee. Firstly, the cocoon rearer complained that the number of representatives from them is not enough. Secondly, they complained that their representatives are not genuine. He cannot protect their interest in fixing price. In most cases his power is too weak to protect the interest of the cocoon rearer. The cocoon rearer demanded that their representative to the price fixing committee must be elected by them rather than selected by the Sericulture Board. Thirdly, they complain that the committee always tries to protect the interest of the Sericulture Board not the

TABLE 7.13

NUMBER OF REARING ENTERPRISE SELLING PRODUCT ON CREDIT AND
PERCENTAGE OF TOTAL PRODUCT SOLD ON CREDIT
AT DIFFERENT LENGTH OF PAYMENT TIME

Length of payment time (in days)	Number of rearing enterprise selling different percentage of total product on credit			
	Less than 50%	50% to 75%	More than 75%	Total
Upto 7	-	1 (1.56)	-	1 (1.57)
8 - 15	9 (14.06)	7 (10.94)	-	16 (25.00)
16 - 21	2 (3.13)	5 (7.81)	-	7 (10.95)
22 - 30	8 (12.50)	20 (31.25)	2 (3.13)	30 (46.88)
More than 30 days	-	9 (14.06)	1 (1.56)	10 (15.63)
Total	19 (29.69)	42 (65.63)	3 (4.69)	64 (100.00)

Figures within parentheses represent the percentage of the rearing enterprise selling product on credit.

sericulturists. The committee in most cases, does not take into consideration that cost of production in fixing the price of cocoon. As such the price fixed by the committee brings very little return to the cocoon rearer. Moreover, the cocoon producer does not get the price fixed by the Sericulture Board as there exists a long chain of middle-man between the Board and the rearer.

Price of cocoon varies between open market and Sericulture Board. Table 7.14 and 7.15 shows respectively the percentage of rearing and reeling enterprise getting higher price of cocoon in the local market over the price fixed by the Sericulture Board. As is evidenced from these tables that almost all rearing and reeling enterprises reported

TABLE 7.14

PERCENTAGE OF REARING ENTERPRISE GETTING HIGHER PRICE OF COCOON
IN THE LOCAL MARKET OVER THE PRICE FIXED BY THE SERICULTURE BOARD

Percentage of higher price offered by private purchaser	Percentage number of enterprise getting higher price for cocoon		
	Local	Foreign	F.1 Hybrid
0	4.23	-	1.41
Upto - 15	16.90	8.45	7.74
15 - 20	2.11	1.41	6.34
20 - 30	49.3	28.87	33.80
30 - 40	13.38	4.93	5.63
40 & above	13.38	4.93	4.23
Total	99.30	48.59	59.15

TABLE 7.15

PERCENTAGE OF REELING ENTERPRISE GETTING HIGHER PRICE OF COCOON IN THE
LOCAL MARKETING OVER THE PRICE FIXED BY THE SERICULTURE BOARD
FOR DIFFERENT VARIETY OF COCOON PRODUCED BY REELER

Percentage of higher price offered by the private purchaser	Number of enterprise getting higher price for cocoon		
	Local	Foreign	Gross
0	-	-	-
Upto - 15	34.62	15.38	7.69
15 - 20	-	-	7.69
20 - 30	46.15	34.62	26.92
30 - 40	11.54	11.54	11.54
40 and above	7.69	7.69	7.69
Total	100.00	69.23	61.50

that the local trader offers higher price for cocoon than that offered by the Sericulture Board. The tables show that about 17% of the rearing enterprise and 35% of the reeling enterprise told that local traders offer upto 15% higher price for local variety cocoon over the price fixed by the Sericulture Board. As large as 49% of the rearing enterprises and 46% of the reeling enterprise told that price of local variety cocoon varies between the open market and the Sericulture Board at the rate of 20% to 30%. The price of local variety cocoon between the open market the Sericulture Board also varies at the rate of more than 40%. Of course, very small number of enterprise told about this big difference of price. Similar trend of price difference is also revealed for foreign and Fl hybrid variety of cocoon. It is noticeable from the same tables that the price variation within the open market is also very big. The extent of this price variation ranges between 1% to more than 40% depending partly on the quality of cocoon and partly on the bargaining power of the cocoon producer. Both these types of price variation creates severe discontent among the cocoon producer.

7.2.4 Marketing of Raw Silk

For raw silk there is no institutional purchaser but only institutional seller. The Rajshahi silk factory sells approximately 40% of its raw silk. Silk yarn produced in the silk factory is of better quality and hence, it is natural that the silk yarn produced in the factory wins the market competition. Handloom weaver prefers to have filature silk and are ready to pay higher price. Rajshahi silk factory, however, is not in a position to meet this demand. Exactly the same happens here as it would happen in a market where supply falls too short of demand.

In the open market of raw silk, sellers are the reeling enterprise and the buyers are the weaving enterprise, money lenders, local traders, and the suppliers of raw materials. The reeling enterprise as a seller of raw silk has to compete with the Sericulture Board, BSCIC and private importer of raw silk. Thus, the reeling enterprises cannot exert its

full control on the selling price. It could have been in a better position in the market if it could use its product in its own industry undertaking the weaving activity. But it is seen earlier that none of the reeling enterprises go for weaving. So, it has no other alternative but to sell its entire raw silk produce. Here it is the importance of integration of reeling and weaving activity into one enterprise. This integration will increase the bargaining power of the enterprise both as a seller and a buyer of raw silk.

Table 7.16 shows percentage of reeling enterprise selling silk yarn to different buyers. As is evidenced from the table that about 54% of the reeling enterprise sells their product to the weaving enterprises. Next important buyer of their product is the local trader - who, usually, acts as the middleman between the reeler and the weaver. Only about 12% of the reeling enterprises sell their product to the money lender and the price they receive from the money lender is only 0% to 15% lower than the market price (see the table 7.11). More than 19% of reeling enterprises sell their product to the supplier of raw materials and surely at lower price than that in the market (see the table 7.12). For reeling enterprise creditor and raw material supplier can not make as much a problem as they make for rearing enterprise who in large number has to sell to them.

Table 7.17 shows the number of reeling enterprise selling product on credit and percentage of total product sold on credit at different length of payment time. As it would appear from the table that 46% of the reeling enterprise sell their product on credit. Most of them sell less than half of their produce. Period of payment varies between one week to one month. Credit sale is not that difficult for the reeling enterprise as most of them are economically solvent. But credit sale creates a severe problem for the rearing enterprise who is in great need of ready finance.

TABLE 7.16

NUMBER AND PERCENTAGE OF REELING ENTERPRISE SELLING SILK
YARN TO DIFFERENT PURCHASER

Types of purchaser	Number of reeling enterprise selling silk yarn to different purchaser	Percentage
Weaving enterprise	14	53.85
Money lender or mahajan	3	11.54
Local trader and middleman	11	42.30
Supplier of raw materials	2	7.69
Others	2	7.69

TABLE 7.17

NUMBER OF REELING ENTERPRISE SELLING PRODUCT ON CREDIT AND PERCENTAGE
OF TOTAL PROEUCT SOLD ON CREDIT AT DIFFERENT LENGTH OF PAYMENT TIME

Length of payment time (in days)	Number of reeling enterprise selling on credit different amount of total product			Total
	Less than 50%	50 to 75%	More than 75%	
Upto 7 days	-	-	-	-
8 - 15	2 (16.67)	-	-	2 (26.67)
16 - 21	1 (8.34)	-	-	1 (8.34)
22 - 30	5 (41.66)	1 (8.34)	-	6 (50.00)
More than 30 days	-	2 (16.67)	1 (8.34)	3 (25.00)
Total	8 (66.67)	3 (25.00)	1 (8.34)	12 (100.00)

Figures within parenthese are the percentages of total number of reeling enterprise selling product to the supplier of raw materials.

7.2.5 Marketing of Silk Cloth

In the market of silk cloth there is a big gap between the supply of and demand for silk cloth. This gap is met by foreign product either imported officially or unofficially. Silk cloth imported either from India, or Japan or China is of superior quality and also less costly as improved technique is used in these countries. Silk cloth produced in Bangladesh cannot compete with the imported silk cloth. As such, while asking proposal from the weaving entrepreneur for developing weaving industry, most of them mentioned that stopage of import of silk cloth is of prior importance for flourishing silk industry in Bangladesh.

Rajshahi silk factory supplies more than 24% of the total marketable surplus while the rest is supplied by the weaving enterprises of Shibganj in Rajshahi and Mirpur of Dhaka district. There is little competition between public and private section since these sectors produce different types of silk cloth. It is mentioned earlier that the weaving enterprises of Shibganj produces mainly the variety of gorod share and the weaving enterprises of Mirpur produce mainly the variety of katan saree of Banarasee type while Rajshahi silk factory produces printed silk saree and silk fabrics used for shirts and other dresses.

Table 7.18 identifying the purchaser of product shows that money lenders in largest number purchase the silk product from the weaving enterprises in the private sector. Table 7.19 is showing that all weaving enterprises selling to the creditors, sell at price lower than the market price. sell at price lower than the market price. Most of them sells at 1% to 10% lower price than that in the market. Only about 11% of weaving enterprises selling to the creditor sells at 15% to 25% lower price than that in the market while as large as 64% of the rearing enterprises (as shown earlier in this chapter) selling to the creditor, sells at the same price.

TABLE 7.18

PERCENTAGE OF WEAVING ENTERPRISE SELLING THEIR
PRODUCT OF SILK CLOTH TO DIFFERENT PRUCHASER

Types of purchaser	Number of enterprise selling product	Percentage
Weaving enterprise	17	26.15
Money lender or mahajan	19	29.23
Local trader	13	20.00
Consumer		6.15
Supplier of raw materials	12	18.46
Others	5	8.06

TABLE 7.19

NUMBER OF WEAVING ENTERPRISE SELLING PRODUCT
TO THE CREDITOR

Extent of varition between the market price and the price paid by the creditor	Number of weaving enterprise selling to creditor at different prices	Percentage
Upto 10% lower	12	63.16
10% to 15% lower	4	21.05
15% to 25% lower	2	10.53
More than 25% lower	-	-
Total	18	100.00

Table 7.18 shows that more than 26% of the weaving enterprise sells to the weaver. It needs an explanation. It is already mentioned earlier that the rich weavers can influence both the Sericulture Board and other supplier of silk yarn to buy most of the silk yarn allotted for all weaver in the private sector. They in turn sell the same to the weavers who have hardly any access to the Sericulture Board, BSCIC and other suppliers of imported silk yarn.

Credit sale is a big problem for the weaving enterprise. About 82% of the weaving enterprise sell their product on credit. As is evidenced by Table 7.20 that only 7.5% of the enterprises among them sell less than 50% of their product while as large as 60% of the enterprises among them sell 50% to 75% of their product on credit. The rest sell more than 76% of their product. Thus, it is apparent from Table 7.20 that most of the weaving industry product are sold on credit. Period of repayment is also quite long which varies between 7 days to more than 30 days (see Table 7.20). The weaving enterprise suffers from the credit sale as there is no credit system to satisfy their need for ready finance. While reporting the problems of marketing more than 50% of the weaving enterprises mentioned credit sale is a problem for them.

From the above discussion it is clearly understandable that among the sericulture entrepreneurs the rearing entrepreneurs is the most sufferer of the marketing problems. However, planting, reeling and weaving entrepreneurs are also not less sufferers of marketing problems. Therefore, any attempt at developing the sericulture industry should start from solving all marketing problems. Because solution of marketing problems will give the maximum possible incentive to all types of sericulture entrepreneurs to expand their production.

TABLE 7.20

NUMBER OF WEAVING ENTERPRISE SELLING PRODUCT ON CREDIT AND
THE PERCENTAGE OF TOTAL PRODUCT SOLD ON CREDIT AT
DIFFERENT LENGTH OF PAYMENT PERIOD

Length of payment period	Number of enterprise selling different amount of total produced on credit			
	50%	50%-75%	More than 75%	Total
7 days	-	2 (3.77)	2	2 (3.77)
8 - 15 days	1 (1.89)	4 (7.55)	2 (3.77)	7 (13.21)
16 - 21 days	1 (1.89)	6 (11.32)	-	7 (13.21)
22 - 30 days	1 (1.89)	11 (20.75)	11 (20.75)	23 (43.44)
More than 30 days	1 (1.89)	9 (16.98)	4 (7.55)	14 (26.42)
Total	4 (7.55)	32 (60.38)	17 (32.08)	53 (100.00)

Figures within parentheses are the percentage of weaving enterprise selling product on credit.

CHAPTER VIII

EXISTING PROJECTS, PROGRAMMES AND INSTITUTES IN THE
FIELD OF SERICULTURE INDUSTRY8.1 Introduction

During the war of liberation in 1971 almost all the nurseries and demonstration centres sustained considerable damages of mulberry lands, rearing houses, and technical equipment which affected severely their activities. In view of this, Bangladesh Cottage Industries Corporation (BCIC) who was vested with the responsibility of developing sericulture industry immediately after liberation, took a comprehensive scheme on "Development of Sericulture Nurseries and Demonstration Centres", the objective of which was to reactivate, reorganise and revitalise the nurseries and demonstration centres. After this scheme, there was no attempt for a long time at developing sericulture industry. Then in 1978, to accentuate the interest in sericulture development the Government of Bangladesh created a Sericulture Board under the Ministry of Textiles. It was vested with all responsibilities of development of sericulture industry in Bangladesh. Immediately after its formation Sericulture Board undertook two revised schemes. One was on "Development of Sericulture Nurseries and Demonstration Centres" and the other was on "Bangladesh Sericulture Research And Training Institute". The objectives of the scheme on "Development of Sericulture" were same as the schemes undertaken earlier under BCIC on the same issue, i.e. as reactivation and reorganisation of nurseries and demonstration centres. The only difference was that in the latter scheme some objectives were outlined more specifically as mentioned below¹:

- 1) Supply of disease free cross-breed layings in place of seed cocoon.
- 2) Introduction and production of Multi/Bivoltines and F-I Hybrid.
- 3) Introduction of eri-worm rearing on a large scale in the villages.

¹/ Revised scheme on Development of Sericulture, Nurseries, and Demonstration Centres, BSB, Rajshahi, August, 1978.

- 4) Introduction of Kuga rearing in Sylhet area.
- 5) Arrangement of collective rearing of silk worm at the young stage for better production of cocoons in the rearers' houses at low cost.

Under this scheme, at present in Bangladesh there are 12 nurseries engaged in the production of silk worm egg and mulberry sapling. These nurseries are grouped into two categories namely mother stock nurseries and seed-multiplication nurseries. Mother stock nurseries maintain stocklots and supply basic seeds to the seed multiplication nurseries which produce commercial seeds and supply to the rearer. All these nurseries are located at the following places.

Mother - Stock Nurseries

1. Konabari, Dhaka District
2. Mainamati, Comilla District
3. Ishurdi, Pabna District
4. Bogra, Bogra District
5. Sylhet, Sylhet District
6. Bhatiary, Chittagong District
7. Chandraghona, Chittagong Hill Tracts District

Seed Multiplication Nurseries

8. Bhola hat, Rajshahi District
9. Nawabganj, Rajshahi District
10. Mirganj, Rajshahi District
11. Dinajpur, Dinajpur District
12. Rangpur, Rangpur District

It is observable here that the nurseries are widely spread all over Bangladesh. Main objective of the wide dispersion of Mother Stock Nurseries is to protect the sericulture industry from the ruin due to epidemic of silk worm. It was observed that when there is an outbreak of epidemic, all silk worms die leaving no trace of any seed.

In the case no possibility is left to re-establish the industry. If the Mother Stock Nursery are situated at long distance the seed could be multiplied in another nursery even if the whole lot in one place is destroyed.

There are 42 demonstration centres attached to the above described nurseries. The demonstrator serve as the vital link between the planter and rearer on the one hand and the nurseries on the other. He is supposed to assess the requirement of cuttings of the planters and silk worm egg of the rearers in the private sector and arranges to supply them from the nurseries in time. He is also supposed to provide technical guidance to the rearers.

Effort by the nurseries and demonstration centres failed to achieve their objectives mainly due to shortage of fund, scientific instrument and other appliances and lack of skilled, trained and experienced staff. Moreover, implementation of the scheme needs sufficient motivation among the planters and rearers in the private sector for which there is not provision in the scheme. It does not approach to the planter and rearer only who know the real problem of planting and rearing. As a result the scheme could not have any appeal to them who are the real implementing authority of the scheme.

The research programme of Bangladesh Government in the field of sericulture could not operate successfully for failure to appoint qualified Research Officers and to make arrangement for necessary training of the research officers in different fields of research. To overcome the modicum of technical personnel and research officer, an integrated scheme namely "Silk Research and Training Institute" was prepared merging together the silk conditioning house of the silk factory and technological institute which were set up at Rajshahi in 1959-60 to carry out Research and Training. The scheme has the following objectives to be fulfilled during 1973/74 - 1979/80¹.

¹/ Revised Scheme on Bangladesh Sericulture Research and Training Institute, BSB, September 1978, pp. 4-5.

- 1) To re-activate, re-organise and integrate the institute for the improvement of all branches of sericulture and silk industry which have direct bearing on the quality and cost of all kinds of silk fibres and fabrics.
- 2) To achieve full co-ordination and efficient management through proper utilisation of manpower and equipment and thus bring about economy in the cost of operations.
- 3) To introduce additional training courses namely, cultivation of feeding plants, rearing of different silk worm including their diseases and remedies over and above existing courses on post cocoon side.
- 4) To work as standard institute in respect of all kinds of silk fibres and fabrics.
- 5) To work as service facility centre for the private silk weaving factories.

No doubt the objectives are very ambitious. But very little of these objectives has been achieved so far.

8.2 Crash Programme

The bright prospect of sericulture industry encourages the Government of Bangladesh to undertake a Crash Programme in August 1978 at an investment cost of Tk. 399 Lac. It is an extension programme scheduled to be completed in June 1981. Executive authority of this programme is vested in Sericulture Board. The objective of the programme is to develop the agro-based sericulture and sericulture industries and to create rural employment. To achieve these objectives the programme is designed to extend the mulberry acreage by 2180 acres of land and to increase silk cocoon by 21,45,120 lbs and endi cocoon by 10,00,000 lbs. To fulfil these targets the scheme will provide the facilities including (1) Motivation among the people to take up sericulture/Sericulture; (2) Training in scientific method of rearing; (3) Technical-know-how; (4) Supply of disease free and high yielding silk worm eggs; (5) Supply of mulberry cuttings and rearing equipment; (6) Financial support in the form of subsidy of an amount of Tk. 3,398.00 for each family having one bigha of land.

For extension of sericulture industry each and every provision in the scheme seems rational and to the right point. It seems, there is no doubt that by the end of 1981 silk production of Bangladesh will be several times more than the present production.

But in reality this may not be the case as the target were designed without any prior survey of development potentials of sericulture industry. The target are designed from the top without taking into consideration the bottom where lies the real authority who will fulfil targets.

The crash programme designers are aware that the public sector Nurseries are not capable of producing required amount of seed cocoon as such there is provision in the scheme that the balance of quantity of seed cocoon shall have to be met through selected seed growers in the private sector. The production of seed cocoon is highly specialised work involving technical and scientific silk which the private growers have in rare case. In no way the responsibility of producing seed cocoon should be vested on private grower. Production of seed cocoon is the most important job in sericulture industry as the entire sericulture industry may be ruined through lack of appreciation of the need for healthy high quality silk worm seed.

The crash programme is designed for extension of sericulture industry. So it has nothing to do with the sericulture activities which are existing in Bhola hat and Shibganj for centuries together. Moreover, crash programme is highly subsidised and in assessing the programme amount of benefit is visualised only, and no cost calculation is taken into account. It is very much doubtful whether the programme will be self-sustained in the near future.

8.3 Swiss-Bangladesh Bilateral Project

The Government of Switzerland in cooperation with the Government of Bangladesh undertook a subsidy-cum-credit scheme in 1978. The objective of the scheme is to extend sericulture activities in six thanas of the country. These six thanas are Charghat, Putia and Natore of the Rajshahi district and Bogra, Joypurhat and Panchbibi of the Bogra district. The

Sericulture Board has been vested with the responsibility of implementing this programme. A total of 1000 acres would be covered by this scheme. A total of 2000 small farmer and 400 landless farmers will be provided with subsidy and credit under this scheme to start sericulture activities.

Total cost of the project was estimated at Tk. 188.11 lacs. The Swiss Government will contribute Tk. 116.82 lacs in foreign exchange and the Bangladesh Government will contribute Tk. 71.29 lacs to the total cost of the project.

There is no empirical assessment of the performance of this programme. Thus, little can be said about the success and failure of this programme. However, some details of the activities of this programme will tell about the development of Sericulture Industry under this programme. In August, 1980 2 Lacks Taka worth of equipments for research and nursery purposes arrived in Bangladesh under this programme. Sericulture Board Research Department has no knowledge of the equipments. The equipments were imported according to the wish of Swiss advisor. But unfortunately, none of the said equipments are necessary for sericulture research in Bangladesh.

It is a highly subsidised programme and there is sufficient doubt as to its self-sustainability in the near future. In preparing the programme little assessment is made of when it will be self sustained whether it is cost beneficial and whether the benefit goes to the actual needy. Without this assessment it is very doubtful that the project will bring long-term positive effect.

8.4 Sericulture Programme of CARE:

CARE, a voluntary organisation in conjunction with the Integrated Rural Development Programme (IRDP) of the Government of Bangladesh launched in 1977 a programme of providing sericulture training among the members of women's cooperative in four thanas namely Gopalpur and Kotwali of Dhaka district and Mirzapur and Kaliakoir of Tangail district. There are several surveys on this programme conducted by CARE officials named

Walter E. North, M.A. Rab, Jane L. Rosser and Ingrid T. Buxell. All CARE surveys indicate that cooperative members have a low interest in sericulture on any sustained basis. The surveys indicate that more than 25% of the women received sericulture training is non-cooperative member and most of them used the training as a means of earning income. Only 10% of the cooperative member included in the surveys are interested in taking training and most of the cooperative member taking training did not use training for income earning purpose. Hence, the CARE sericulture programme could have been more viable if it could work within non-cooperative member. But in this respect CARE is hampered by its agreement with IRDP which limits it to work only with cooperative members. Thus, the CARE sericulture programme is not received by the actual needy.

CARE, thinks the policy of the Bangladesh Government towards sericulture and cooperative movement is mostly responsible for inefficient functioning of the CARE Sericulture Programme. It is stated in most of the CARE literature on sericulture that the Government of Bangladesh has not established a clear policy in terms of indigenous silk production. It is also stated that current policy appears not to favour silk spinning by using local technology. Nor does current policy appear to favour sericulture. The same view was expressed by Walter E. North when the author had a talk with him. He was telling that the women are very much interested in taking training. But they cannot use their training as they do not receive regular supply of endi eggs, castor leaves, spinning charka etc. which the Government is supposed to supply. But actually, the Government is supposed to supply. But actually, the Government's policy towards silk cultivation is not the same as CARE expressed. Going through the silk policy of the Government as expressed in the 2nd Five Year Plan¹ one can not agree with CARE's view. In actual most of the inefficiencies of the CARE programme may be due to the fact that CARE sericulture programme does not aim at right direction.

^{1/} Policies and objectives of the 2nd Five Year Plan as to sericulture industry is discussed in the latter part of this chapter.

CARE ericulture project aims at providing only training and during training period it gives all facilities such as food, accommodation, pin money etc. Naturally, many helpless women feel interested to take training. But after taking training they are helpless again. CARE ericulture project does not provide castor leaves. Rearing space, rearing equipment etc., which are necessary to apply acquired training.

8.5 Sericulture Programme Initiated by others Voluntary Organisation

There are some more voluntary organisations which are interested in silk production. The primary emphasis among voluntary agencies interested in silk production and processing is on the expansion of endi silk production. As such little relevant for sericulture which deals with mulberry silk production. World Vision of Bangladesh, KARITAS Bangladesh, Bangladesh Volunter Service and Canadian University Service are important among the voluntary organisations interest in silk production. World Vision has an endi project in Demra, Dhaka. It aims at planting castor constructing two rearing room, and giving training in rearing and spinning. Ericulture project of KARITAS is in progress in Jessore and Rajshahi district with the assistance of the Sericulture Board, Bangladesh. Canadian University Service Overseas has ericulture project in Manikganj, Dhaka, in which 300 women are producers.

Jatiya Mahila Sangstha, sponsored by the Government of Bangladesh, started a comprehensive programme on women. Ericulture is a part of this programme which aims at providing training of two months on castor planting, rearing silk worm, spinning and weaving.

8.6 Rangpur and Dinajpur Rehabilitation Service

Rangpur, Dinajpur Rehabilitation Service (RDRS), a voluntary organisation operated by the Lutharan World Federation, Department of World Service, Geneva, gives special attention on sericulture to be developed in the areas of its operation in the district of Dinajpur and Rangpur. At the beginning of sericulture programme mulberry gardens were established on 165 acres of private growers. These growers constituting 1250 families have taken up the occupation of sericulture in addition

to their farming. This programme has created increased enthusiasm among the people to such an extent that presently mulberry plantation is extended by another 119 acres covering 349 families. The total acreage of mulberry now reached to 378 acres and the number of grower reached to 1550 families¹. At present RDRS has established six demonstration and extension centres. RDRS also has a programme to donate endi spinning charka and handloom among the poor village people for their economic upliftment in greater sphere and bring them on their own footing. In order to provide quick marketing facility to the growers RDRS has established a silk factory at Thakurgaon which is the only venture in the private sector in Bangladesh.

It is essential that the government agency for the development of the sector and voluntary agencies maintain a close cooperation with technical information, training, finance support and above all marketing of product. But there is little cooperation among all the agencies interested in silk production. Result is, multiplication of programmes and project on sericulture with little objective gain.

8.7 Five Year Plan and Sericulture Industry

After liberation Bangladesh has commissioned two five years plan. The main objectives of the First Five Year Plan (1973-78) as to sericulture industry were to reconstruct the war ravaged sericulture projects as well as to improve the existing facilities and carry on some extension works. As such First Plan did not put any production targets. During the period of First Five Year Plan the production of seed cocoon rose from 300,000 lbs. to 600,000 lbs. and the area under mulberry production in the private sector rose from 850 acres to 1250 acres².

At the end of First Five Year Plan a Two Year Plan was undertaken in Bangladesh. The main objectives of the Two Year Plan in the field of sericulture industry were the completion of three on going projects which were to be completed by the end of First Five Year Plan and

¹/ Activity Report for the year 1979, Small Scale Industries Programme, Thakurgaon, LWF/RDRS, Bangladesh, p. 5.

²/ Performance Evaluation of the First Five Year and Two Year Plan and proposals for the Second Five Year Plan, p. 4.

implementing two new projects, viz. the Swiss-Bangladesh Bilateral project and Crash Programme for extension of sericulture in the private sector¹. By the end of the Two Year Plan the total acreage will increase from 1250 to 2800 and the number of people engaged in sericulture and ericulture will increase from 18,000 to 41,600 while the production of cocoon will rise from 600,000 lbs. to 1700,000 lbs. Yarn production from 39,600 lbs. to 106,250 lbs. and fabric production from 317,432 yds. to 850,000 yds². But the performance of the Two Year Plan is far behind this target. Sericulture Board made an evaluation of the performance of the First Five Year Plan and Two Year Plan in the field of sericulture industry. In the light of this performance evaluation of the First Five Year Plan and Two Year Plan the following proposals are formulated to be included in the Second Five Year Plan to carry out Sericulture Development successfully³.

1. To consolidate and improve efficiency of the existing Nurseries.
2. To effect increased supply of mulberry saplings and healthy layings of improved varieties.
3. To expand rearing facilities in the private sector.
4. To expand and strengthen other extension services for proportion of sericulture and ericulture.
5. To encourage growth of indigenous and semi-indigenous technology through research adioption both at precocoon and post cocoon stages.
6. To establish pilot reeling units for some centres for introducing mini-filatures to the private sector with a view to properly and economically utilizing the increased cocoon production in the country.
7. To strengthen marketing faciliteis.
8. To explore the possibility of utilizing silk waste.

^{1/} Ibid p. 5

^{2/} Ibid, p.6

^{3/} Ibid, p. 8-9

The final draft of Second Five Year Plan has already been outlined. The objectives of the Second Five Year Plan with respect to sericulture are mentioned below¹:

1. To increase employment for man and women in the rural areas and to increase their income and reduce poverty.
2. Tap the unexploited resources in the field of sericulture for economic upliftment.
3. To increase export market and thus to earn foreign exchange.
4. To introduce modern and scientific methods of production and thus to affect productivity of sericulture.
5. Ensure wide dispersal of national income by creating employment opportunities to the rural masses.

Following production targets were set in the earlier draft of the Second Five Year Plan².

1. By the end of Second Five Year Plan acreage under mulberry cultivation would increase from 2800 to 7378 acres.
2. Production of cocoon would increase from 17,00,000 lbs to 30,50,000 lbs.
3. Fabric production would increase from 8,50,000 yds. to 30,25,000 yds.

In the final draft of the Second Five Year Plan Sericulture production targets are revised upward.

8.8 Performance of the Sericulture Board

Board was established with the following objectives:

1. Expansion of Sericulture.
2. To run Rajshahi Silk Factory established in 1960, perfectly to make it a profitable organisation.
3. Research activity on sericulture and ericulture industry.
4. Marketing of Produce.

¹/ Ibid, p. 8.

²/ Ibid, p. 6.

Analysing Board's activity it is easily understandable how far the objectives of the Board is attained. The Board took-up crash programme and Swiss-Bangladesh Bilateral Programme for the development and wide expansion of sericulture industry. The extent of development supposed to be made upon implementation of these 2 programmes were discussed earlier. It was targetted that upon implementation of the projects mulberry cultivation will be expanded to 29 hundred acres of land and cocoon production would be 18 lac pounds. But in fact, none of the targets were fulfilled.

According to the authorities of the Sericulture Board, the silk factory at the present time produces 1250 pounds of silk yarn and 7200 yds. of silk fabric. Whereas the production target was 24420 pounds of silk yarn and 1 lac 32 thousand yds. of silk fabric annually. 200 reeling machines are there in the factory 60 of those are closed. This is due to the shortage of cocoon, the authorities disclosed. Even the management think, it may be necessary to declare lay-off in the reeling department. There are 43 weaving machines, 43 power looms and 11 hand-looms in the factory but it runs in only one shift.

Marketing was one of the objectives of establishing Sericulture Board. The problems created by the Board in the process of marketing cocoons were discussed in detail in the seventh chapter of this study. While visiting silk factory, the authors of the present study learnt that a huge quality of silk fabric worth about 35 lacs taka are lying unsold for a long time in the factory's warehouse. And already some 4 lacs taka worth of fabric is not fit for use.

There is no staff in the marketing department of the Board for the last 2 years. The staff of the Board for the department of finance is in additional charge of this department. But he has no time to look after the activities of marketing department. However none of the department is fully staffed. There is always internal clique between the high officials and among different departments.

The Chairman of the Board, in average, stay only 7 days a month in Rajshahi, rest of the days of the month he stays in Dhaka.

Government has classified Sericulture Development Board as a "C" category Board. As a result, officers never get interested to stay here. This is another reason why the officers are not active at their duties and they are always in try to get transferred to other Board's or Organisations.

CHAPTER IX

9.1 Policy Implication and Conclusion

Some concrete policy proposals relating to the development of sericulture industry came from the sericulturists themselves while conducting the present survey. The proposals put forward by the sericulture enterprises aim at solving the problems they are facing bitterly for a long time in carrying out the sericulture activity. As such the project proposals given by the sericulturists themselves will provide a practical and realistic base for policy formulation for the development of sericulture. Some proposals and recommendations have also been formulated on the basis of the observation made in the previous chapters.

9.1.1 Marketing Development Scheme

When asked for development proposals from the sericulture entrepreneurs most of them proposed marketing development. The proposals coming from the sericulturists to be included in the marketing development scheme are enlisted in Table 9.1. As is evidenced in the table that rearing and reeling entrepreneurs in the largest number propose the withdrawal of all restrictions imposed by the Sericulture Board on sericulture marketing and sericulture production. It is already discussed on several occasions in this report the extent of hardship the sericulturists have to undergo due to the marketing and production policy of the Sericulture Board. That is why the marketing and production policy of the Sericulture Board needs to be deeply thought over. Sericulture market should not also be completely free because, in free trading, as sericulture is a poorer's business, the sericulturists will very easily get into the trap of moneylenders, middlemen and other unscrupulous traders. On the other hand, the present system of procurement formulated by the Sericulture Board should not be allowed to continue. Keeping in mind the above facts a marketing policy should be formulated so that the poorest section of the sericulture sector could be served best.

TABLE 9.1

PERCENTAGE OF SERICULTURE ENTREPRENEUR MAKING DIFFERENT PROPOSALS TO BE INCLUDED
IN THE MARKETING DEVELOPMENT SCHEME FOR SERICULTURE INDUSTRY

Enterprise type	Procurement of cocoons by S.B. in time	Supply of layings in time	Supply of insec- ticides in time	Introduc- tion of local weighing system	Introduc- tion of supply materials through ration- ing system	Introduc- tion of fari- price system for both raw materials and product	Aboli- tion of middle man between rearer & S.B.	With- drawl of all restric- tion imposing selling of cocoon by S.B.	Stop- age of import silk fabric	Procu- rement of silk by S.B.	Export faci- lity	Others
Planting enterprise	5.26	-	-	5.26	-	-	10.53	26.32	-	-	-	-
Rearing enterprise	12.68	8.45	25.35	10.56	-	12.68	11.97	64.08	-	-	-	16.90
Reeling enterprise	30.77	11.54	11.54	7.69	3.85	-	7.69	69.23	-	-	-	38.46
Weaving	1.54	-	-	-	50.77	29.23	18.46	9.23	35.38	7.69	9.23	40.00
Total	11.11	5.96	15.48	7.14	13.49	14.68	13.10	43.65	9.13	1.98	2.38	23.81

As it would appear from table 9.2 that the supply of formaline, soda and other insecticides in right time and right quantity is an important proposal coming from the rearing entrepreneurs to be included in the marketing development scheme. Other marketing development proposals coming from the rearing enterprises, in order of importance are: Procurement of cocoon by the Sericulture Board in right time and right place; introduction of fair price for both the raw materials and the product; abolition of middleman between the producer and the Sericulture Board; introduction of local measurement system; supply of disease free quality layings in time without unofficial payment and some other unspecified proposals. The reeling entrepreneurs, although in lesser number gave almost the same marketing development proposals as the rearing entrepreneurs gave.

The most important marketing development proposal coming from the weaving entrepreneurs is the introduction of rationing system for raw materials. As is evidenced in the table 9.1 that more than 35% of the weavers gave this proposal. They proposed that raw materials should be rationed according to the number of loom the enterprise possesses. They thought that rationing system will save them from the clutches of the rich weavers who manage to get all allotment of the raw materials for weaving industry and sell to the weavers at high price. Other marketing development proposals coming from the weaving entrepreneurs are: stoppage of the import of silk fabric; abolition of middleman both from the product and the raw material market; provision of export facilities; procurement of cloth by the government etc. In addition to these proposals the author made some marketing development proposals in this report while discussing the marketing of sericulture product in chapter seven. The authorities responsible for sericulture development must take into consideration all these proposals and accordingly must formulate the marketing development scheme.

9.1.2 Credit Scheme

Next to the marketing development scheme the credit scheme is the most important one proposed by the sericulture entrepreneurs. The proposals coming from the sericulture entrepreneur for credit scheme are enlisted in the Table 9.2. The table shows that the largest number of entrepreneurs proposed the introduction of simple official formalities in institutional loan. The present procedure of taking loan from the institutional source is not understood to the sericulture entrepreneurs almost all of whom are devoid of formal education. Thus, institutional loan involving a long procedure of official formalities will go to few persons having education. More than 35% of the enterprise proposed that loan must be available at door step. Generally the institutions providing loan are situated in the town far away from village where sericulture activities are carried on. Transport system between village and town is not good. There is no bus route nor there is any public transport facilities between Rajshahi town and Bholahat which is about 60 miles away from Rajshahi town. As such it will be a real pain for the sericulturists in Bholahat, if they have to come to town for taking

TABLE 9.2

PERCENTAGE OF SERICULTURE ENTREPRENEUR MAKING DIFFERENT PROPOSAL
TO BE INCLUDED IN THE CREDIT SCHEME FOR SERICULTURE INDUSTRY

Enterprise type	Intro- duction of simple official facilities	Loan at door step	Seasonal loan	Loan at low rate of interest	Loan on easy term and conditions	Long term loan
Planting enterprise	21.04	36.84	10.53	84.21	15.79	-
Rearing enterprise	52.11	41.55	32.39	36.62	13.38	2.82
Reeling enterprise	26.92	15.38	7.69	19.23	19.23	11.54
Weaving enterprise	47.69	29.23	3.08	32.31	27.69	26.15
Total	46.03	35.32	20.63	37.30	17.86	9.52

loan. Therefore, the branch of commercial bank, cooperative bank or any other loan giving institution must be established at village level. Seasonal loan and loan at low rate of interest are two important proposals coming from the sericulture entrepreneurs. More than 20% of the sericulture entrepreneurs proposed that seasonal loan must be available for developing sericulture industry. Among them rearing entrepreneurs are the largest in number in making this proposal as they have as minimum as four seasons of production in a year. About 31% of the enterprises proposed that the rate of interest should be low. The planting entrepreneurs are the largest in number in proposing low rate of interest. Large number of rearing entrepreneur also made this proposal. These two group of entrepreneurs are the poorest among the sericulture entrepreneurs. Here the author like to make a proposal of introducing differential rate of interest for different groups of sericulture enterprise so that distributive justice is attained among the sericulturist. Other proposals included in the scheme are: loan on easy terms and conditions, loan without interest, long term loan, ensured supply of loan etc.

9.1.3 Technology Development Scheme

Very few proposals regarding the technology development scheme came from the sericulture entrepreneurs as they are ignorant of the improved technology used in sericulture activities. Table 9.3 enlisted the proposals consisting of the technology development scheme. The table shows that irrigation development is proposed by 37% of the entrepreneurs. Irrigation development is the basis of sericulture development. Development of irrigation will increase the production of mulberry several times which in turn increase the production of cocoon, silk yarn and silk fabric. Supply of twisting machine is another proposal made solely by the weaving enterprises.

Technology development is one of the most important issue in sericulture development. It is observed in the present survey that the technology used in carrying out the sericulture activity in Bangladesh is most traditional and traditional technology is mostly responsible for low productivity and low quality. Sericulture industry with

TABLE 9.3

PERCENTAGE OF SERICULTURE ENTREPRENEURS MAKING DIFFERENT
PROPOSALS TO BE INCLUDED IN THE TECHNOLOGY AND SKILL
DEVELOPMENT SCHEME FOR THE SERICULTURE ENTERPRISE

Enterprise type	Irrigation development	Supply of twisting machine	Supply of the technical facilities	Extension service and skill deve- lopment scheme
Planting enterprise	57.89	10.53	15.79	42.11
Rearing enterprise	49.30	19.72	11.97	25.21
Reeling enterprise	46.15	19.23	-	23.08
Weaving enterprise	1.54	-	9.23	7.69
Total	36.90	13.89	10.32	27.38

traditional technology cannot compete in the world market of silk products. Sericulture industry with traditional technology cannot even win the competition in the home market where always superior quality imported product drives away the inferior quality home product. Thus, technology development lies at the root of sericulture development. In discussing the technology involved in sericulture industry the author made several proposals for technology development. Among these proposals the following may be mentioned again:

- a) Introduction of high yielding varieties of mulberry with proper fertilization and irrigation.
- b) Introduction of high yielding variety of silk worm best suited in the existing climatic condition and in the existing rearing facilities.
- c) Adoption of cooperative rearing instead of individual rearing.
- d) Introduction of proper sanitation with the use of paraffin-paper and regular bed cleaning.
- e) Use of the proper dose of disinfectants.
- f) Khatghai reeling should be improved as it has been done in India.

- g) Much care should be taken in preparing the processes of reeling.
- h) Introduction of collective cooking and brushing of cocoon.
- i) For proper cooking of cocoon and for saving time and fuel three pan system of cooking should be introduced.
- j) Technique of Khatghai reeling should be improved in Indian style.
- k) Semi-automatic loom should be introduced in large number.

9.1.4 Extention Service and Skill Development Scheme

About 28% of the entrepreneurs suggested adoption of extention service and skill development scheme as an urgent need for developing sericulture industry. For this purpose extention and demonstration centre should be set up at village level. The Sericulture Board must have been observation whether the extention officers are performing their job properly. To make the extention officer active there must be a system of givigg him reward as an incentive on the basis of the performance of the sericulture activities in his area. The extention officer must be well informed and well educated about sericulture activities so that he can solve every problem facing the sericulture entrepreneurs in following new technique of production. For the purpose of skill development, existing training system should be reorganised so that practice based rather than theory based training is provided. Training facilities should be extended at thana level if not at village level. For training purposes if the expert technical personnel is not available in the country, experts should be invited from the neighbouring countries at the initial stage. And later some personnel may be sent abroad for training as technical personnel.

The proposal that was not been made by the sericulture entrepreneurs is the research development proposal. For the long-term interest of sericulture industry research is an important factor. But the existing research institute on Sericulture is inactive. To activate the existing research institute and to extend its activity a scheme namely "Silk Research and Training Institute" was prepared in 1978 with an estimated cost of Tk. 37.72 lakh including a foreign exchange component of Tk. 4.25 lakh.

with long range objectives. But still now little progress is there in the process of the implementation of this scheme. The recommendation of this study will be to hasten the implementation of this scheme.

9.1.5 Other Development Proposals

Other development proposals coming from the sericulture entrepreneurs have been enlisted in Table 9.4. More than 16% of the entrepreneurs proposed that the development of transportation system should be considered as a foremost necessity for developing sericulture industry. It is already mentioned that Bholahat is a remote village having very poor communication system. It is natural that in the absence of proper communication the sericulturists will be exploited bitterly both in the product, raw material and credit market. Training and extension service also cannot be carried out properly in the absence of good communication system. As such, development of communication should be undertaken on priority basis. Electrification is another important proposal made by about 21% of the entrepreneurs. Electrification at village level is bound to bring about a revolutionary change in the technique of sericulture industry. But at the present level of economy of the country, how far the electrification at village level is possible is a matter to think about. The proposal of protecting weaving industry by tax and subsidy made by more than 15% of the weaving entrepreneurs. The proposal of providing incentive to the sericulture entrepreneurs in terms of reward on the basis of their performance in production is made by about 6% of the entrepreneurs. Provision of reward on performance is bound to increase the efficiency of the entrepreneurs.

The authority responsible for formulating development policies for sericulture industry must carefully take into consideration all these proposals and accordingly must formulate development programme. Otherwise, no development programme will be really beneficial to the mass of the sericulturists.

TABLE 9.4

PERCENTAGE OF SERICULTURE ENTREPRENEURS MAKING DIFFERENT OTHER PROPOSALS FOR SERICULTURE DEVELOPMENT

Enterprise type	Transportation system	Electrification	Protection by tax and subsidy	Incentive scheme
Planting enterprise	10.53	21.05	-	5.26
Rearing enterprise	19.01	20.42	-	4.93
Reeling enterprise	34.62	38.46	-	19.23
Weaving enterprise	4.62	15.38	21.54	1.54
Total	16.27	21.03	5.56	5.56

9.1.6 Organisational Change

In addition to these development proposals the authors like to make some proposals regarding the organisation of sericulture industry. One suggestion regarding organisation is already made in earlier chapters as to integration of different stages of sericulture activities into one production unit. The necessity of integration of different stages of sericulture activity is discussed quite elaborately in fourth chapter and in different places of third chapter of this report. The integration of different stages of sericulture will solve a number of problems of planting, rearing and reeling activities. Moreover, integration will increase the income of sericulture enterprises several times. Thus, every attempt should be made to remove all obstacles standing on way of integration. Another suggestion in this respect the author like to make is the cooperative organisation of sericulture activities. Sericulturists in Bangladesh is very poor. As is already described that they are encountered with numerous problems which an individual sericulturist is quite unable to solve. But cooperative organisation of sericulture entrepreneur can easily solve all problems regarding the growth of sericulture development in Bangladesh. It is the cooperative

for loans and credit which will solve the problems of sericulture finance. An individual sericulturist with his little savings can do absolutely nothing. But through cooperative his little savings together with other sericulturists' little saving can attain the power of capital and can arrange for cheap loans for him and other member of the cooperative. Thus, poor sericulturists organised into a cooperative credit society can be their own financier and at the same time can get rid of the money lenders, trader and businessmen who take away the lion share of the fruits of their labour through exorbitant rates of interest. In the same way, the cooperative for marketing will solve all problems of sericulture marketing described in the earlier chapter. Cooperative for supplying sericulture means will solve all problems encountering the sericulturists in the raw materials market. When all these service cooperatives developed on sound basis the ground for organising production cooperative will be created. Organisation of production cooperative aims at large scale production which is not possible without a material base including certain level of capital formation, technological progress and marketing development. Development of service cooperative on sound basis will provide this material base. Therefore, suggestion is made here that production cooperative should be created after all service cooperatives are organised on sound basis.

It is, of course, true that at the present level of motivation among the rural people the success of cooperative organisation is quite difficult. Group ownership of property is only possible when there is large scale motivation among the people, active participation by the members, informed membership, efficient management and organisation, and strong and proper leadership. All these factors affecting the efficiency of cooperative organisation are almost absent in rural Bangladesh. But it is also true that all these factors can be attained through large-scale education and motivation among the people. Education and motivation can convince people that through cooperative they can better improve their situation than as an individual. Through education and training they will acquire knowledge and skill to participate viably in cooperative activities. Education can create informed membership, strong and efficient leader and efficient manager. Education provides

better understanding between the members and staff. Thus, at the beginning of cooperative organisation priority should be given to education and large scale motivation among the sericulture people.

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